- Crandon mill modernized
- Cathodic corrosion-protection
- Pulping with ammonia-base acid
- Tree-length skidding
- Acrylic emulsions for coatings

The Paper Industry

NSSC EVAPORATION

The Swenson forced circulation triple effect evaporator at Watervliet Paper Company, Watervliet, Michigan, concentrates recovered solids from the production of 50 tons per day of NSSC pulp. The design embodies features necessary to avoid the scale ordinarily encountered with these liquors. Swenson has both forced circulation and natural circulation evaporator systems concentrating NSSC liquors and combinations of NSSC and Kraft liquors.

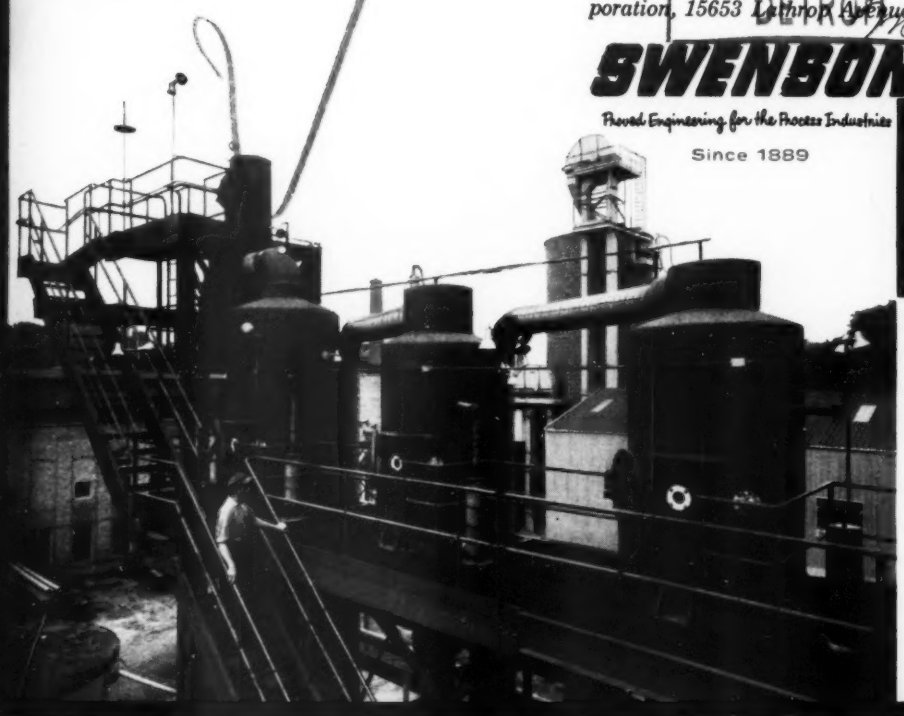
There's a Swenson evaporator for practically every concentration need. Write today for full information on custom-designed, custom-installed evaporators by Swenson. *Swenson Evaporator Company, Division of Whiting Corporation, 15653 Lathrop Avenue, Harvey, Illinois.*

SWENSON

Proved Engineering for the Process Industries

Since 1889

A Division of WHITING Corporation



Have any questions about pulp?

The pulp you see in this illustration is Abitibi Bleached Sulphit

Mead customers never do!

There's never a doubt about supply or delivery on time. Vast natural reserves and the resources of eight great mills make Mead the dependable source of supply. And Mead's modern and extensive research facilities assure you of the kind of pulp that meets or exceeds any standard of quality. Tell us about your pulp requirements. Whether the pulp you need is chemical or mechanical, from hardwoods or soft woods, bleached or unbleached, our representative will gladly show you why Mead answers your pulp demands best.

MEAD
pulp

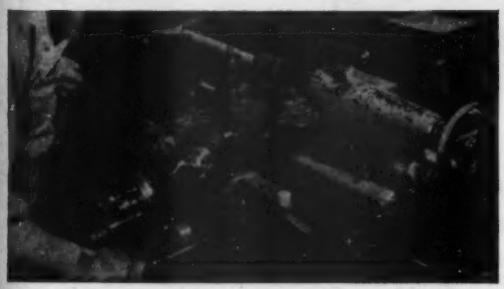
MEAD PULP SALES, INC. • Distributors of Wood Pulp • *Bleached and Unbleached Chemical and Mechanical Wood Pulp*
230 Park Ave., New York 17 • 20 North Wacker Drive, Chicago 6 • 118 W. First St., Dayton 2 • 1504 Sherbrooke St., W., Montreal, Can.

BEAT CORROSION

5 ways easier with Ryertex Omicron PVC

Bending Type 1 PVC pipe around wooden jig

Welding PVC distributor plate for chlorine stripping tower



PVC rod is ideal for many anti-corrosive screw machine products

Workman easily lifts PVC tank enclosure during fabrication

1. **Resists more than 280 chemicals**—Ryertex-Omicron PVC resists the attack of scores of commonly-encountered corrosive solutions and gases—acids, alkalis, waste products, etc. It is non-toxic and inert. It can take continuous service temperatures of up to 185°—is non-magnetic, non-sparking, will not support combustion and is not subject to electrolytic action.

2. **Forms easily**—After softening in a hot oil bath, rigid Ryertex-Omicron PVC pipe is easily bent around a simple wooden jig (see photo). Sheets and rods are also readily formed by heating to between 200° and 260° F.

3. **Welds like metal**—Ryertex-Omicron PVC sheets can be butt welded with hot air equipment to provide a bond that has 85% or more of the tensile strength of the base material. (Filler rods are available from Ryerson.) Light weight sheets are extruded (not laminated) and so can be lap welded without rod merely by heating contact surfaces and pressing together.

4. **Cuts with hand saw, machines on standard equipment**—Both sheet metal and carpentry tools are suitable for cutting Ryertex-Omicron PVC. Hand snips are practical for sheets up to ⅛". Hand, hack, scroll, band and jig saws easily cut this remarkable plastic with standard blades.

5. **Provides strength without weight**—Easy to assemble and install because it weighs only ⅙ as much as steel—½ as much as aluminum—Ryertex-Omicron PVC is nevertheless *not* a fragile material. Its impact strength equals that of cast iron and at room temperatures it has a tensile strength of 8,000 psi.

★ ★ ★

FORMS AND SIZES—Ryertex-Omicron PVC is available from your nearby Ryerson steel-service plant in:

Sheets: Fully extruded sheets (not laminated) 1/32" through ⅜" thick, 40" wide x any length. Molded sheets ½" thick and heavier, 48" wide x 96" long.

Pipe: Schedule 40 and schedule 80 pipe extruded in pipe sizes through 10". Larger sizes welded from pre-curved PVC sheets.

Valves & Fittings: Injection molded and fabricated valves; socket type and threaded fittings; socket type, threaded and blind flanges for all pipe sizes. In addition we fabricate any type of special fittings to order.

Rods: Available in sizes up to 4" in standard 10' and 20' lengths. Welding rod in ⅛", 3/32" and 3/16" diameters.

Fabricated parts—Ryerson offers broad service on fabricated parts and sub-assemblies through all of the 18 Ryerson plants.

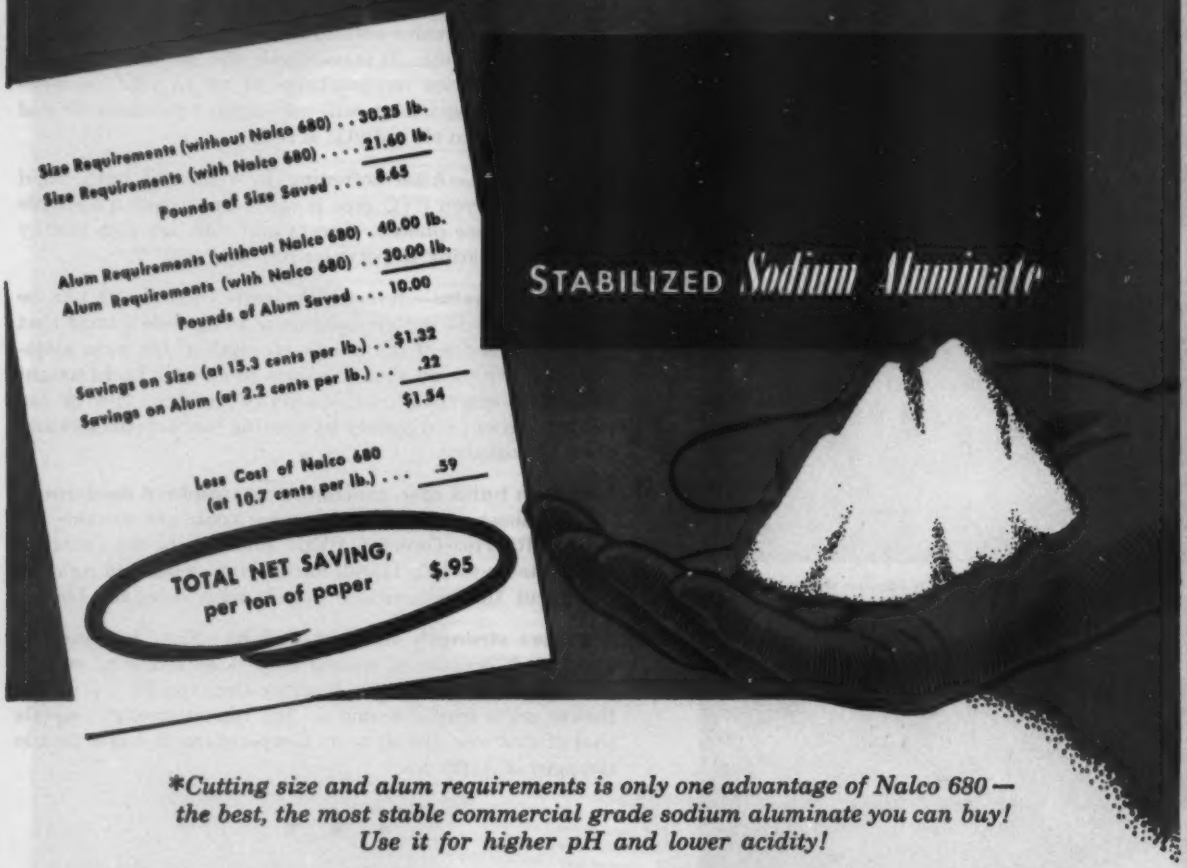
Call us for fast service on your PVC requirements. New technical bulletin sent on request.

RYERSON STEEL

INDUSTRIAL PLASTICS & BEARINGS DIVISION

JOSEPH T. RYERSON & SON, INC. PLANTS: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • INDIANAPOLIS • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

A $.95 SAVING
PER TON OF PAPER* with


Size Requirements (without Nalco 680) . . 30.25 lb.
Size Requirements (with Nalco 680) . . . . 21.60 lb.
Pounds of Size Saved . . . 8.65
Alum Requirements (without Nalco 680) . 40.00 lb.
Alum Requirements (with Nalco 680) . . 30.00 lb.
Pounds of Alum Saved . . . 10.00
Savings on Size (at 15.3 cents per lb.) . . $1.32
Savings on Alum (at 2.2 cents per lb.) . . .22
$1.54
Less Cost of Nalco 680 (at 10.7 cents per lb.) 59
TOTAL NET SAVING, per ton of paper $.95
STABILIZED Sodium Aluminate

**Cutting size and alum requirements is only one advantage of Nalco 680 — the best, the most stable commercial grade sodium aluminate you can buy! Use it for higher pH and lower acidity!*

Don't confuse the production saving in this case history with a cutback in essentials. This mill makes fine writing paper, and quality is the number one requirement.

How Nalco 680 improved specifications while cutting the cost is obvious in the following: *Size test ratings jumped from a range of 45-50 up to 50-60. Ash content went from 5.6-5.8% to 7-7.1%.*

There are many, many other case histories of Nalco 680 success — power savings, greater alumina retention, cleaner machines, better products.

If you would like results like this in your mill, we suggest you check with your Nalco Representative. He has the facts on Nalco 680 applications and will help you all along the way.

NATIONAL ALUMINATE CORPORATION
6232 West 66th Place • Chicago 38, Illinois
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NORTHWESTERN UNITED STATES, HAWAII and ALASKA
The Flox Company, Inc., Minneapolis 3, Minnesota
ITALY: Nalco Italiana, S.p.A. SPAIN: Nalco Espanola, S.A.
WEST GERMANY: Deutsche Nalco-Chemie GmbH

THE Nalco® SYSTEM...Serving the Paper Industry through Practical Applied Science

The Paper Industry

Technology • Engineering • Management • Production

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The PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index.** Index to Volume 38 appears as a part of The April issue.

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bilt-rex

synthetic resins

for

TUB SIZE and

CALENDER STACK

OPERATIONS

Write for details

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York 17, N. Y.

From our point of view..

The potential role of ammonia in pulp and paper

The article on sulfite pulping with ammonia base acid by Warren Beazley, published in this issue, focuses attention on the ammonia situation and its potential use by the pulp and paper industry.

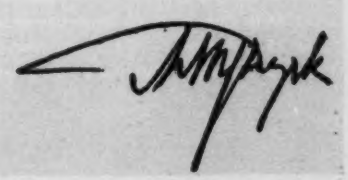
The annual capacity for synthetic ammonia in this country is expected to reach 5,000,000 tons by the end of this year. This means a record ammonia output and a resulting ammonia overcapacity for quite a number of years. In fact, even without any additional capacity after 1957, it is believed that at least five years will elapse before ammonia supply and demand can come into balance.

While agricultural uses take the lion's share (about 75 per cent) of the total ammonia output, industrial ammonia consumption currently amounts to 25 per cent of the production. The pulp and paper industry is listed as the sixth largest industrial consumer of ammonia. The trend in consumption of ammonia is expected to increase in the direction of industrial uses, especially in such applications as the production of chemicals, plastics and synthetic fibers.

In what way can the consumption of ammonia by the pulp and paper industry be increased? The results of recent experiments showing the remarkable growth responses of forest lands to nitrogen fertilizer applications should create substantial immediate and vast future markets for this country's ammonia producers. An increased rate of growth of forest trees and greater yields of pulpwood per acre are definite objectives of the pulp and paper industry and in the interest of the national economy.

The pulp and paper industry would also be advised to take another look at the advantages of ammonia base sulfite pulping. The current and future ammonia overcapacity should create a favorable climate for the development of improved pulping methods and a greater use of ammonia for this purpose.

Manufacturers of ammonia in turn should acquaint themselves thoroughly with the requirements of the pulp and paper industry in this regard and, especially, with the competitive picture of ammonia base vs. calcium base pulping. The conversion to ammonia base pulping would seem extremely tempting to the pulping industry if it could be shown that such a step would result in definite economic advantages for the industry.

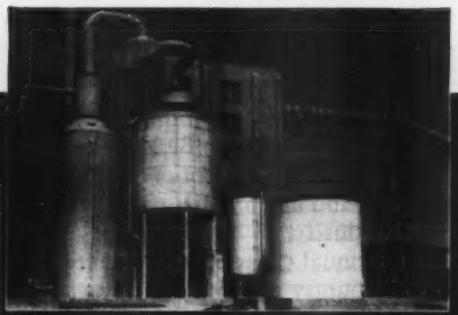


18 HORTON® STRUCTURES help boost production for Mead Corporation mill

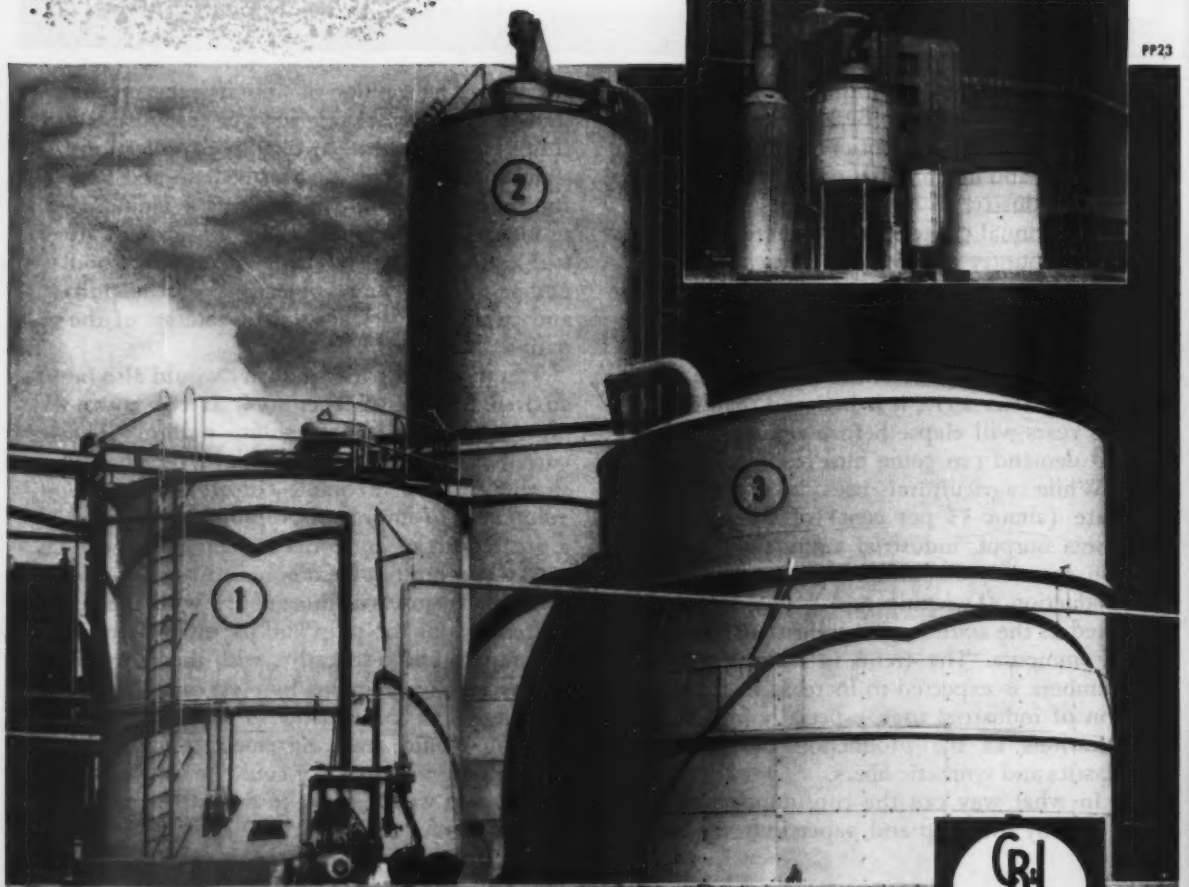
Eighteen CB&I welded steel structures, ranging from digesters and liquor storage tanks to a 250,000-gallon Watersphere®, have played an important role in the increased output and further integration of Mead Corporation's 210-ton pulp mill at Chillicothe, Ohio.

The same specialized design, fabrication and erection services furnished by CB&I for this expansion program are being tendered *daily* throughout the paper and pulp industry. Write our nearest office for further details.

Cone-bottom blow tank equipped with cyclone separator; two liquor measuring tanks and 26-ft. liquor storage tank. All fabricated and erected by CB&I.



PP23



Some of the CB&I structures at this Mead mill include:
(1) 24-ft. diameter caustic liquor storage tank
(2) 15-ft. diameter by 50-foot high foam tank
(3) 26-ft. diameter black liquor storage tank

CB&I

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
New Orleans • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • South Pasadena • Tulsa
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

FORCED TO CHANGE RAW MATERIALS?

Quality control problems can be solved despite dwindling supplies and rising costs

Maintaining quality—that's your big problem when switching to mixed hardwoods, waste or other lower cost and more available raw material.

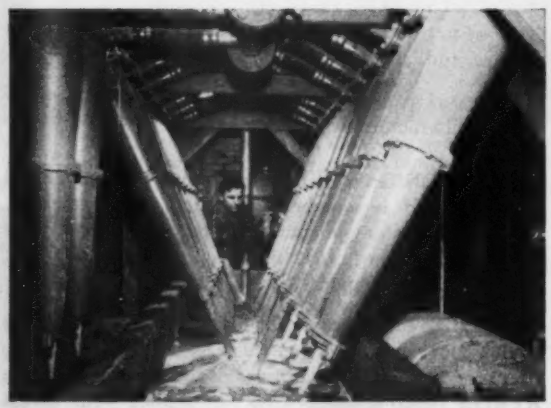
Bauer equipment shown on this page is helping mills meet this serious challenge successfully. Variations encountered in processing are leveled off and can be controlled automatically ahead of the paper machine by pressure refiners regulated through the couch vacuum.

Incidentally, the Bauerite Process of making groundwood type pulp from chips and the Bauer-Bale system of preparing pulp for shipment or storage were also developed to help you keep pace with the changing supply situation.

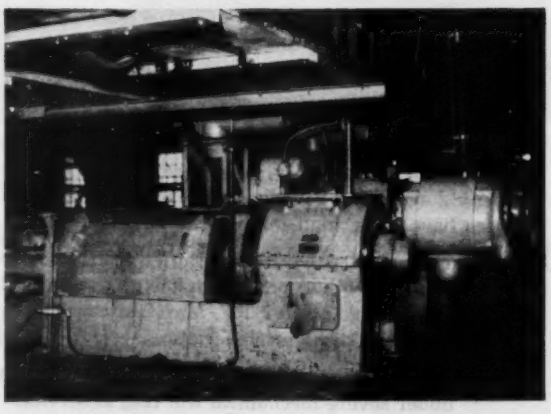
Our experience may well serve you profitably. Why not ask the Bauer man, or write for the facts today?

THE BAUER BROS. CO.

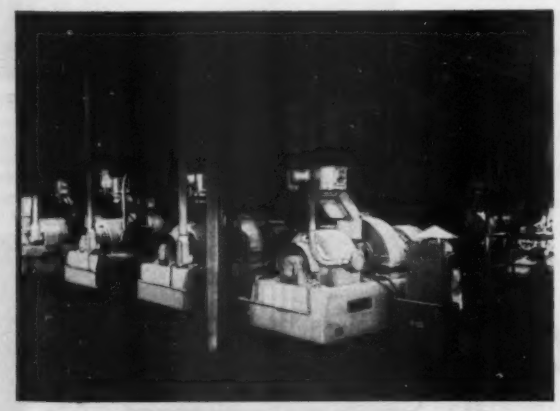
1759 SHERIDAN AVE., SPRINGFIELD, OHIO



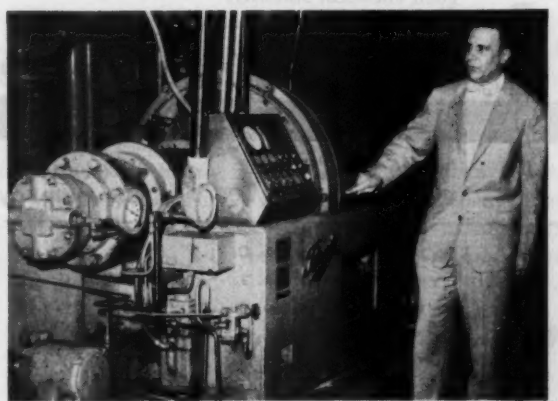
Centri-Cleaners make pulp come clean, assure improved formation.



Pressafiners—efficient in liquor recovery, preliminary fiberizing and mild steaming.



Double Disc Refiners for complete, uniform fiberizing and dispersal.



Pump-Through Refiners for stock preparation, hydration and freeness control.

A new line of Standard Oil greases

RYKON

GREASE

Major breakthrough in grease technology results in development of new thickening agent. New grease has greater high temperature stability, superior multi-purpose qualities, improved lubricating properties.

Standard Oil instituted a grease research and development project several years ago. The result of this work is the line of RYKON Greases, which contain a unique new non-soap, organic thickening agent.

RYKON Greases surpass in stability and performance the best greases made up to this time. They bring to industry new opportunities for improved machine performance. They greatly reduce the maintenance and grease handling problems encountered in industry.

RYKON Grease properties

RYKON Greases are smooth, buttery-textured greases, made from the finest quality, solvent-extracted oil. Their thickening agent is a Standard Oil exclusive. RYKON Greases have these high-quality characteristics:

High temperature stability—Better heat stability than any other petroleum oil grease. ASTM dropping point of 480°F. Maintain consistency in service at high temperatures.

Mechanically stable—Maintain consistency even under severe mechanical working in service.

Chemically stable—Inhibit oxidation. Oil and thickening agent in combination possess extremely good chemical stability.

Wide temperature range—Lubricate at high and low temperatures. Extended range of application thus obtained makes RYKON Greases truly multi-purpose.

Water resistance—Do not lose consistency in presence of water. Highly resistant to water washout.

Oil separation—Minimum bleeding of oil in service and storage.

Anti-rusting—Exceptional natural rust preventive characteristics.

With RYKON Greases, lubrication can become simple, foolproof and less expensive—much less expensive, perhaps, than a single shut down caused by equipment failure due to the use of the wrong type of grease or the use of an "economy" grease lubricant.

RYKON Greases come in four Regular and three Heavy-Duty grades. Thus there is a RYKON Grease to take care of every grease lubrication job. Using RYKON Greases plant-wide can reduce your grease storage requirements, simplify lubrication maintenance training, cut down record keeping, save on dispensing equipment and reduce investment in grease inventories.

Get more facts about RYKON Greases. Call your nearby Standard Oil industrial lubrication specialist in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Check Chart Of RYKON Greases

Regular Line	Grade Consistency
RYKON Grease No. 0	0
RYKON Grease No. 1	1
RYKON Grease No. 2	2
RYKON Grease No. 3	3
Heavy Duty Line	
RYKON Grease No. 0 E. P.	0
RYKON Grease No. 1 E. P.	1
RYKON Grease No. 2 E. P.	2

STANDARD

STANDARD OIL COMPANY (Indiana)

STARTUP — Albany's Service Engineers work with machine builders and mill personnel on new machine planning and startup to assure minimum of felt problems. Above: Glatfelter's paper mill superintendent Jack Miller, J. E. Sirrine Co's A. M. Perdue, gen. supt. George H. Glatfelter, and Albany's Chief Service Engineer Larry Woodside discuss startup problems of new Glatfelter suction-transfer machine.

OPERATION — Albany Service Engineers analyze machine conditions to help improve felt performance. Above, Larry Woodside checks felt measurement between presses. TROUBLE SHOOTING — Below, Walt Willetts, typical of Albany's Service Engineers, travels nearly 75,000 miles each year to provide on-the-spot service.

What Albany Felt Service Engineering Means to YOU!

Night and day . . . Sundays, weekdays and holidays . . . Albany's crack Service Engineering team is on the job! From the blueprint stage on new machines to the problem of keeping the oldest machines running properly, these "master mechanics" of felt performance are ***on call*** to help you get the most from your felts.

The Service Engineer's diagnosis of your machine's requirements, translated to Albany's research-design-manufacturing departments, results in a ***truly*** custom-designed felt for each position and, inevitably, felt performance that can add a bright note to your profit picture!

Take advantage of the years of know-how represented by Albany's outstanding staff of five ***fully qualified*** Service Engineers. Your Albany Sales Engineer will be glad to arrange a Service Engineering call to suit your convenience. His goal, as always, to help you produce ***more saleable tons per day!***

ALBANY

FELT COMPANY

Main Office & Plant, Albany, N.Y. Other plants: Hoosick Falls, N.Y.
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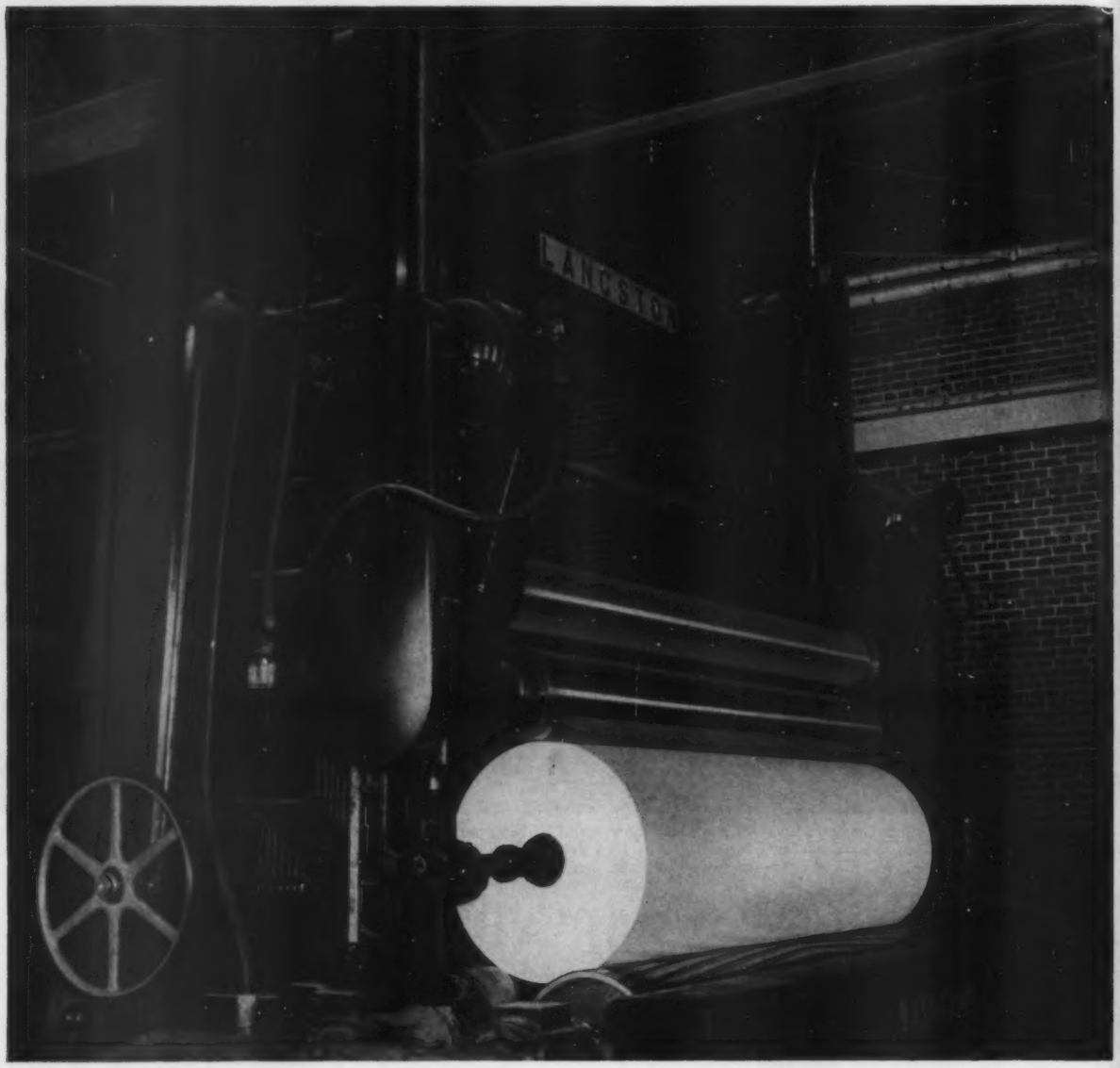
"THE WORLD'S LARGEST MANUFACTURER OF PAPER MACHINE FELTS"



Langston Slitter and Winder features precision roll density control

Here's a way for you to get uniform roll density from the core to the outside. This type "DH" Slitter and Winder features hydraulic rider roll control that automatically adds or subtracts rider roll weight.

This arrangement makes it possible to constantly maintain correct nip pressure to compensate for the changing diameter and weight of the rewound roll. A simple valve permits setting the correct rider roll weight for various grades and basis weights of both paper and board.

Pushbuttons for raising and lowering the rider roll during threadup replace complicated chains, sprockets, and bulky counterweights, thus speeding up production by reducing setup time.

Learn more. Write SAMUEL M. LANGSTON Co., 6th & Jefferson Sts., Camden 4, N.J.

LANGSTON *Leadership...by design*

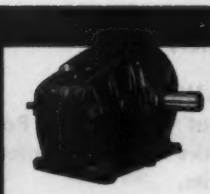
In parallel shaft drives . . . look for

resistance to shock and overloading

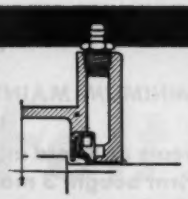
You'll find it . . . and these "plus" performance features . . . when you specify LINK-BELT

Under the shocks and overloads that are often encountered by parallel shaft gear drives, rugged housing construction is vital if shaft alignment is to be maintained. That's why Link-Belt adds special reinforcement at points of greatest stress . . . has developed this design expressly for endurance in heavy-duty service.

Write for your copy of Book 2619 on this broad line with ratios to more than 300:1. Or get first-hand information from your nearest Link-Belt office or authorized stock-carrying distributor.



Sturdy housing of heavy gray iron provides rigid support of shafts.



Grease-lubricated seals on all input and output shafts prevent entrance of dirt, water.

Precision gears and shafts provide high reduction ratios in small space.

Automatic splash lubrication reliably supplies oil to all gears and bearings.

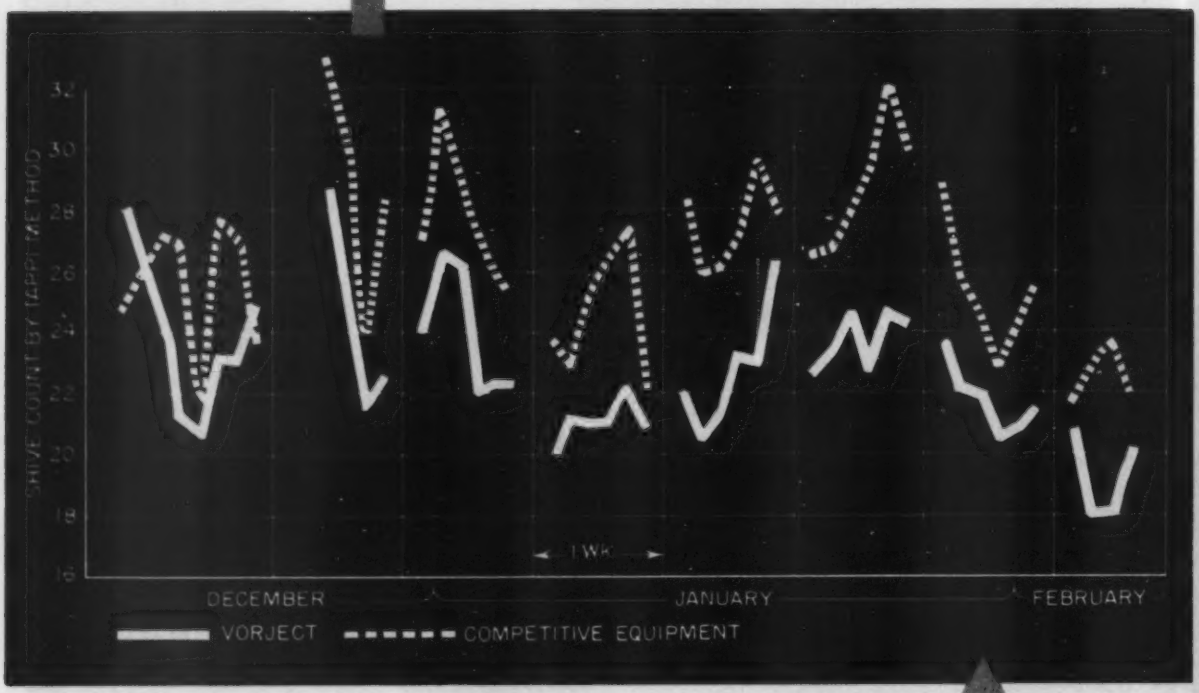
LINK-BELT

ENCLOSED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,430

Performance Speaks For Itself . . .

Compare VORJECT® shive removal with competitive equipment



The graph demonstrates the effectiveness of the NICHOLS FREEMAN 610 Vorject Cleaner when compared with competitive equipment, in actual mill operation, for a period of 45 working days. The Vorject consistently showed more efficient shive removal.

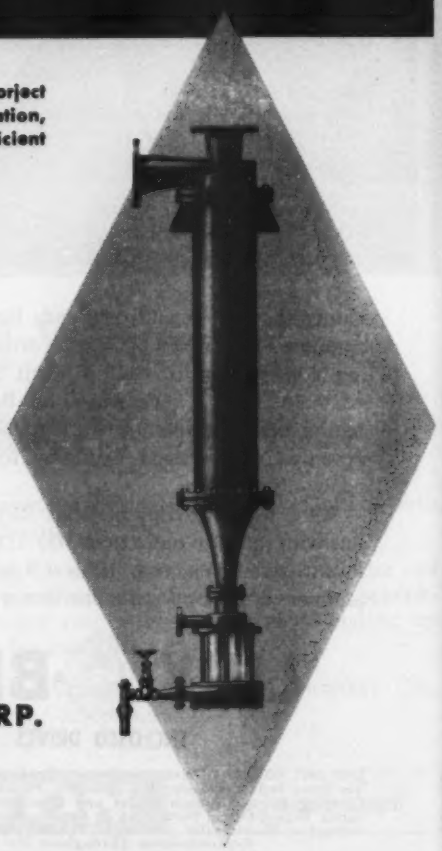
Get ALL the facts on the Vorject

STAINLESS STEEL CONSTRUCTION
No liners

MINIMUM MAINTENANCE
Unit at Continental Paper Co. ran 2 years on board mill stocks with no maintenance required. Firm bought 3 more units.

NO INSUCTION OF AIR
No eductors or water addition required. Machine installation test shows air in stock at fan pump 1.%—after Vorjects, 0.75%.

EFFICIENT SHIVE REMOVAL
See graph above.



NICHOLS ENGINEERING & RESEARCH CORP.
70 Pine St., New York 5, N. Y.
405 Montgomery St., San Francisco 4, Calif.
1477 Sherbrooke St. W., Montreal 25, Canada

We've built an Entirely New Felt Structure

Born from an idea... developed thru years of research—

the NEW TENAX* Dura-Loft* Felt!

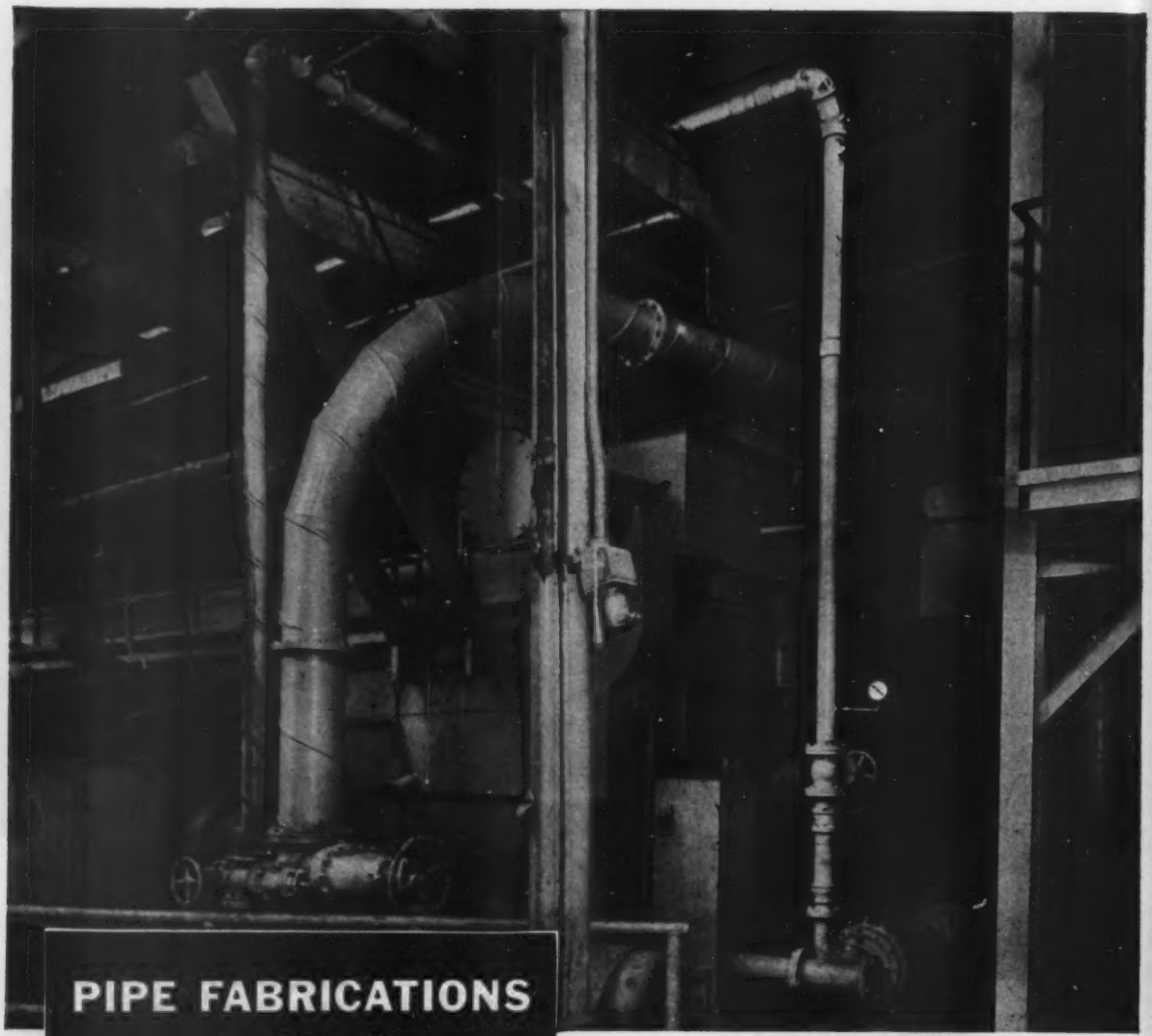
Completely new in concept... new in felt making techniques. You will hear much more about DURA-LOFT. In the meantime TENAX Field Representatives, informed with complete reports of its tests, applications and results, can now discuss with you DURA-LOFT's potentialities in your own mill.

*TRADE MARK

LOCKPORT FELT COMPANY, Inc.

Serving the Papermakers Since 1891

NEWFANE, N. Y. STARKVILLE, MISS.



PIPE FABRICATIONS
In Steel, Alloys or Stainless

Piping layouts fabricated of Naylor Spiralweld give you distinct advantages—whether built of steel, alloys or stainless.

Light weight for easy handling. Spiral-lock construction for extra strength and safety. Precision fabrication for exact fit.

By combining pipe and fittings in pre-fabricated units, extra flanges and connections can be eliminated to assure economy along with Naylor's extra performance.

Whether you need stock pipe lengths, standard fittings, special fabrications or engineered layouts, check with Naylor. Write for Bulletins No. 507 and 525, or send specifications for quotation.

NAYLOR

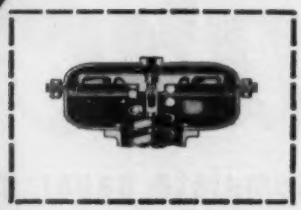
NAYLOR PIPE COMPANY
1233 East 92nd Street, Chicago 19, Illinois

Eastern U.S. and Foreign Sales Office:
60 East 42nd Street, New York 17, New York

Any Way You Look At It

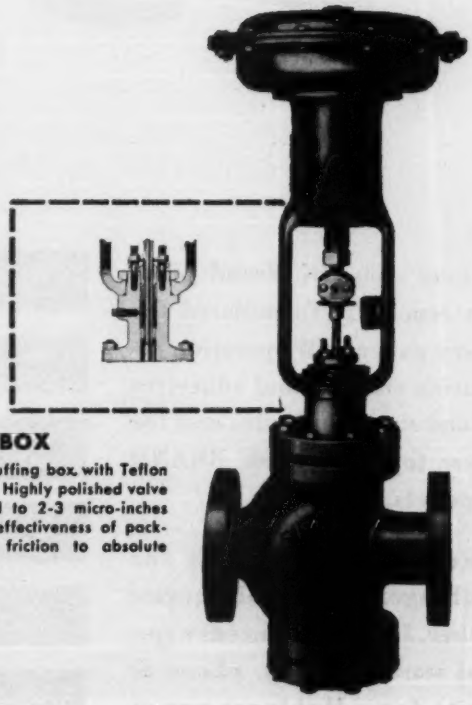
FISHER® Control Valves

are your BEST BET!



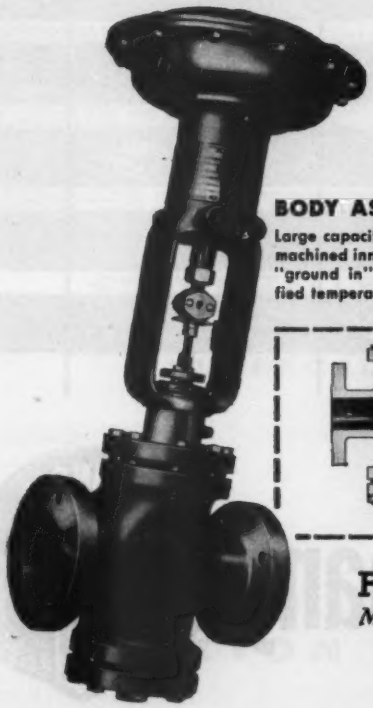
DIAPHRAGM ASSEMBLIES

Extra thick steel casings are zinc electro-plated, iridited and then given prime and final paint coats. Specially designed molded diaphragm with nylon insert gives practically constant effective area throughout valve stroke.



STUFFING BOX

Bolted gland stuffing box with Teflon V-Ring packing. Highly polished valve stem is finished to 2-3 micro-inches RMS to insure effectiveness of packing and keep friction to absolute minimum.



BODY ASSEMBLIES

Large capacity bodies with accurately machined inner valves are individually "ground in" under customer's specified temperature conditions.

Realizing their importance in the control system, Fisher has given careful attention to design and construction of diaphragm control valves. Any way you look at it—from the standpoint of durable construction or accuracy of performance—Fisher Diaphragm Control Valves are your best bet.

FISHER GOVERNOR COMPANY

Marshalltown, Iowa • *Woodstock, Ontario*

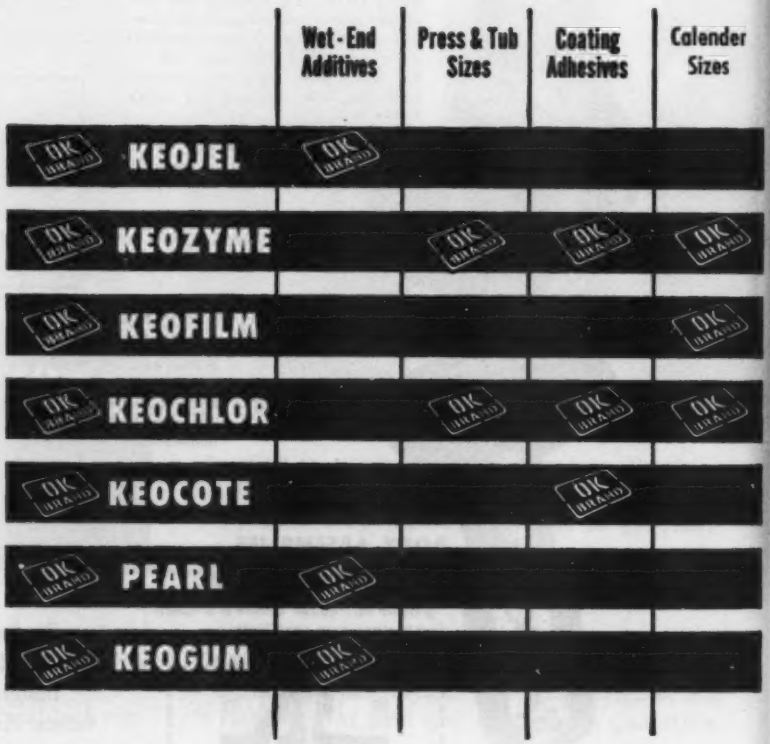
World Leader in Research for Better Pressure and Liquid Level Control

...for superior paper

Use OK BRAND Starches

at no extra cost

the complete paper mill line



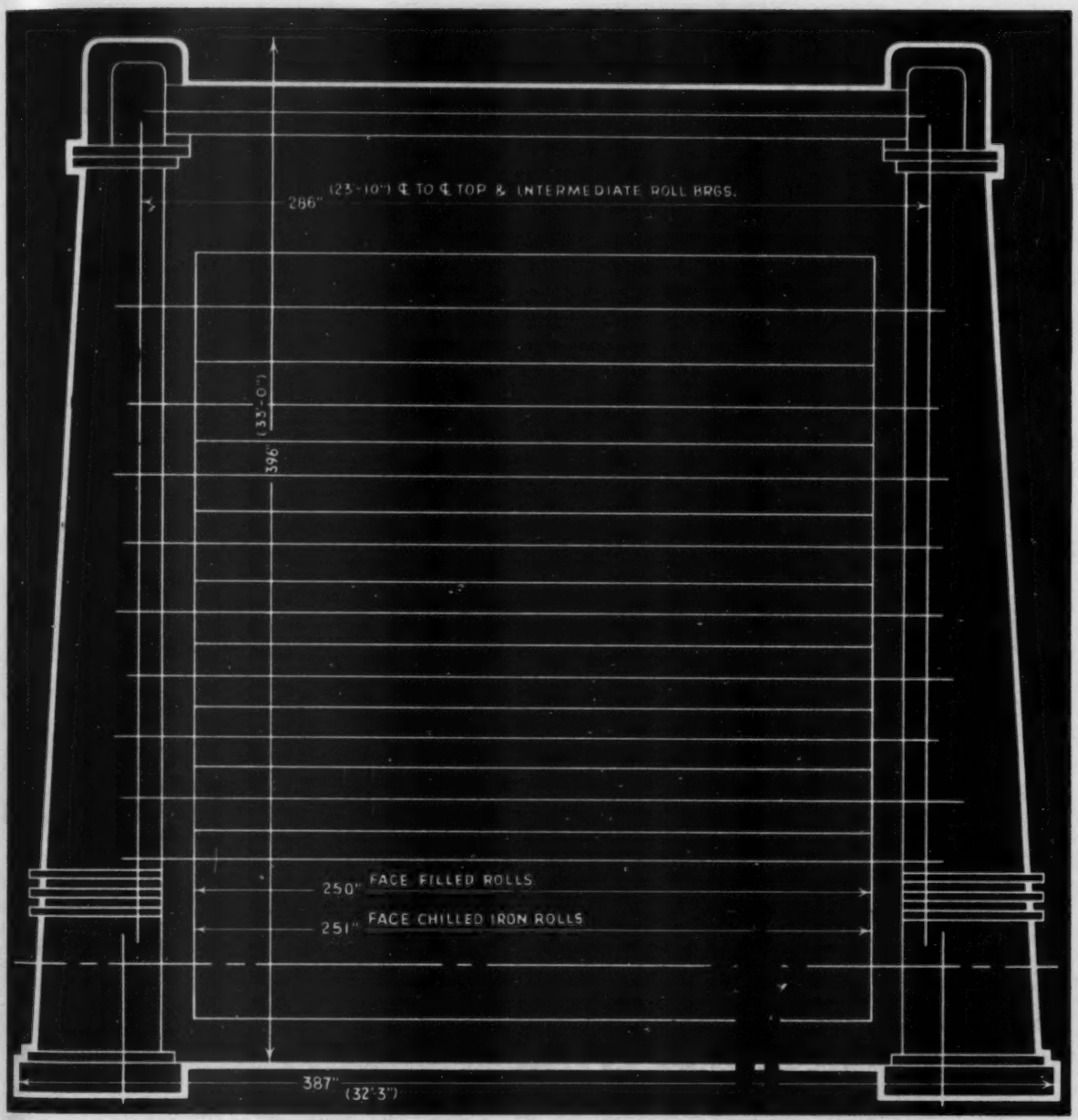
There's an OK Brand product especially formulated for every paper mill operation requiring starches and adhesives ...and there's no extra cost for these top-quality OK BRAND products.

There's no extra cost for Hubinger Technical Service either. If your mill needs a special starch product, phone or write for a Hubinger paper-starch technical service representative. He will be glad to help you solve your starch problems. You'll find him OK too.

The Hubinger Company

KEOKUK, IOWA

HUBINGER — QUALITY PRODUCTS FROM CORN — 76 YEARS



CROWN-ZELLERBACH SELECTS THE APPLETON MACHINE COMPANY TO BUILD THE LARGEST SUPERCALENDERS IN THE UNITED STATES!

Recently, Crown-Zellerbach asked Appleton to build two giant 250-inch, 10-roll supercalenders. These supercalenders—the largest ever built in the United States—will be installed in the new St. Francisville (Louisiana) Paper Company plant which C-Z is constructing and owns jointly with Time, Inc.

Difficult specifications to meet . . . but Appleton's ability to build the tough ones is a proven fact. In the past 10 years, Appleton has built over 70% of all the supercalenders made or sold in the United States and Canada.

knowing and filling the needs of the paper industry

APPLETON MACHINE COMPANY

Appleton, Wisconsin

New!
SPECIAL PURPOSE LOOM
SPECIAL ROLLS REQUIRED

New 380" dryer felt loom manufactured by Southeastern Loom and Machine Works, a Division of Abney Mills. Manufacturers of special machinery for the textile and paper industries, Southeastern recently completed installation of four heavy-duty looms of a type formerly successfully manufactured only in England.

ACIPCO

Centrifugally Spun STEEL TUBES

Rolls in this 380" Southeastern loom, designed for weaving thick dryer felts for the paper industry, must stand extremely heavy loading. Minimum roll deflection and run-out are vital to successful operation.

The long length necessary—33'6"—imposed a requirement for unusual dynamic balance and dimensional stability in these rolls.

Southeastern Loom and Machine Works, a Division of Abney Mills, selected ACIPCO centrifugally spun steel tubes for the let-off and take-up rolls in this new loom. Because ACIPCO's centrifugal process produces tubes with *inherent* dynamic balance and dimensional stability, and because they can be produced in the longer lengths now being specified by modern equipment manufacturers, the selection was right from the start.

When function and design set up unusual or difficult requirements for the tubular steel or alloy iron parts in your application, call on ACIPCO. You'll get a combination of expert technical assistance, manufacturing competence and high quality centrifugally spun tubing that produces successful results.

Let-off and take-up rolls in this Southeastern dryer felt loom were fabricated from ACIPCO centrifugally spun tubing. Large rolls are 33'6" long, with 10½" OD and 2½" wall thickness.

VERSATILE ACIPCO CENTRIFUGALLY SPUN STEEL TUBES

are used in the manufacture of calender, engraving, press, slitter, rewinder, plate cylinder, squeeze and starch bath rolls, as well as in hundreds of other industrial applications.

SIZE RANGE: Lengths up to 410" to meet modern machinery requirements have been produced. OD's from 2.25" to 50"; wall thicknesses from .25" to 4".

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steel; plain carbon grades and special non-standard analyses.

DISTRIBUTORS

Austin-Hastings Co., Inc.
226 Binney Street
Cambridge 42, Mass.

Peter A. Frasse and Co., Inc.
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New York 13, New York

Lyman Tube & Bearings, Ltd.
920 Ste. Sophie Lane
Montreal 3, Canada

Vinson Steel & Aluminum Co.
4606 Singleton Blvd.
Dallas 7, Texas

J. M. Tull Metal & Supply Co.
285 Marietta St., N.W
Atlanta, Georgia

C. A. Roberts Company
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AMERICAN CAST IRON PIPE CO.
Special Products Division
BIRMINGHAM 2, ALABAMA

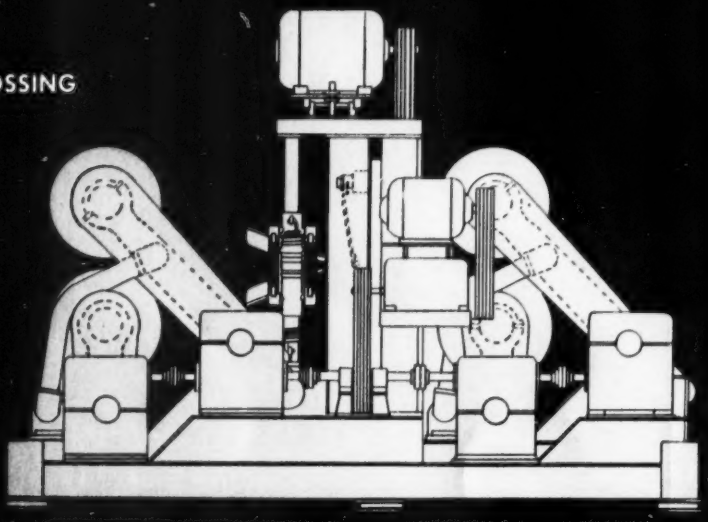
★ TOTAL BARK REMOVAL WITHOUT ROSSING

★ COMPLETELY AUTOMATIC

★ POSITIVE LOG CENTERING DEVICE

★ HARDWOOD OR SOFTWOOD
FROZEN OR CROOKED

★ RUGGED, DEPENDABLE, PROVEN



a ★ Performer
The S20-8′ BARKER

IMPCO®

IMPROVED MACHINERY INC.

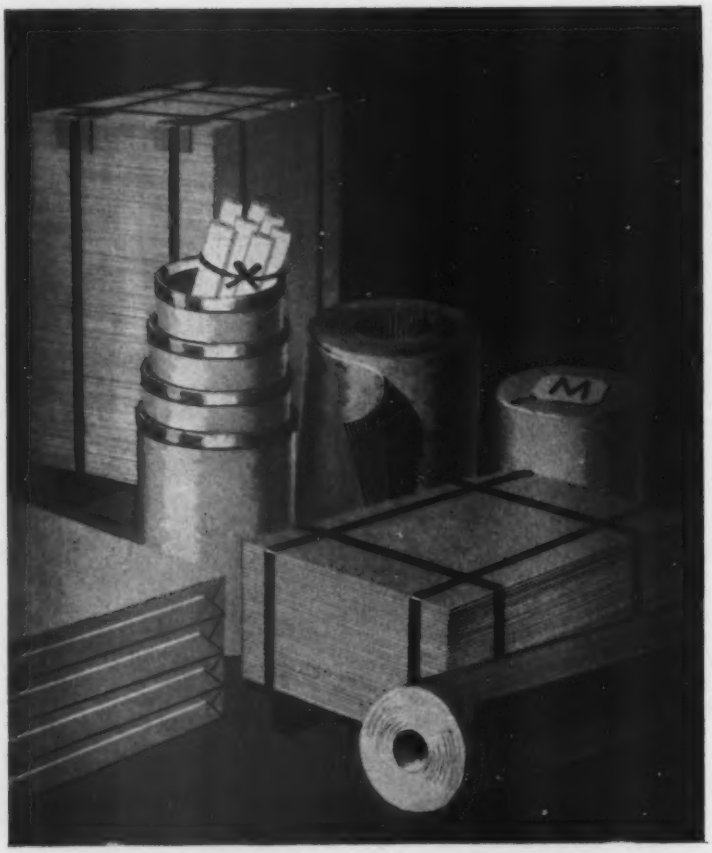
NASHUA, NEW HAMPSHIRE

SEND FOR BULLETIN F1-1

nt Applied For

In Canada, Sherbrooke Machineries Limited, Sherbrooke, Quebec

For trouble-free production of Quality Paper and Paperboard ...choose from these brands of starches →



...and these brands of dextrines and gums →

Starches

HERCULES

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NEW IMPROVED

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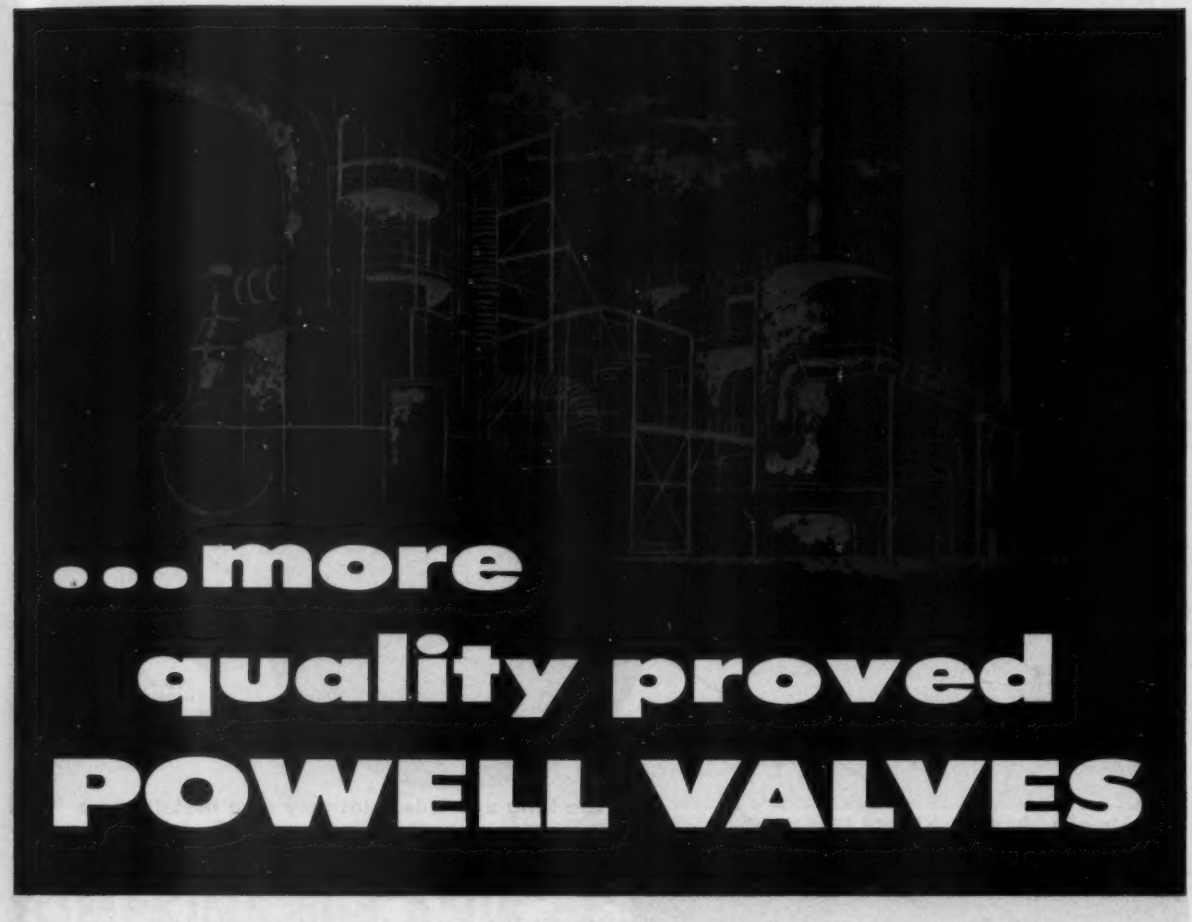
FREE TECHNICAL ASSISTANCE

New and improved products for the paper industry are constantly being developed by our technical staff. For assistance in solving any sizing or adhesive problem, write:

CORN PRODUCTS SALES COMPANY

17 BATTERY PLACE, NEW YORK 4, N. Y.



...more quality proved POWELL VALVES

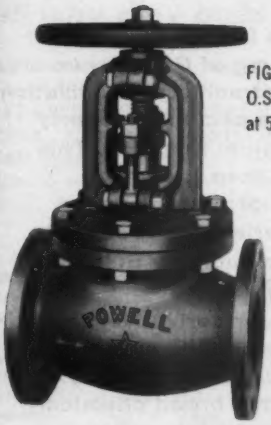


FIG. 2429—Large Size Stainless Steel O.S.&Y. Globe Valve for 150 Pounds W.P. at 500 F. or 230 W.P. at 100 F.

FIG. 1314A—1500-Pound Integral Bonnet Stainless Steel "Y" Valve.

FIG. 2453SG—Stainless Steel O.S.&Y. Gate Valve for 150 Pounds W.P.

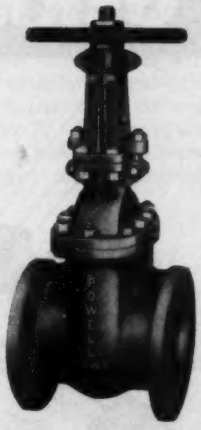


FIG. 2342—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W.P.

Designed for long life, designed for dependable service

Consult your Powell Valve distributor for all the facts about quality proved bronze, iron, steel and corrosion-resistant valves. For every flow problem . . . there is a Powell Valve to solve it.

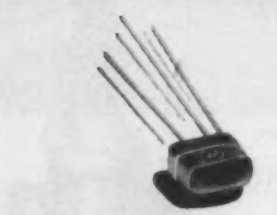
THE WM. POWELL COMPANY, CINCINNATI 22, OHIO . . . 111th YEAR

Sulphur

helps to create
Headline Products

CHEMICAL PROGRESS WEEK APRIL 8-12

GERMANIUM



Not too long ago this relatively rare metal was a laboratory curiosity. What to do with it? Today, it's the heart of the tiny transistor—the latest giant of electronics!

What's the connection between Sulphur and Germanium?

There are two, in fact. One is man-made, involving the routine leaching of Germanium ores with Sulphuric Acid prior to tetrachloride distillation. The other takes advantage of a peculiar property of the natural mineral, Germanium Sulphide. This mineral can be volatilized and then sublimed, providing an effective method of separating the Germanium from gangue material. The process is called "Concentration of Germanium by Sulphide Sublimation".

Again Sulphur, through its major derivative, Sulphuric Acid, and a natural sulphide play an important role in our ever-expanding economy. It is difficult to find many items in the broad chemical-metallurgical field that do not somewhere along the production line make use of Sulphur or a derivative.

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units
- Newgulf, Texas
- Moss Bluff, Texas
- Spindletop, Texas
- Worland, Wyoming

F. J. Tompkins, Chief Design Engineer (right), Bernard Anik, Mechanical Engineer (left rear), Singmaster & Breyer, N. Y. C. Foreground, Michael De Piano, Cooper Alloy Corp.

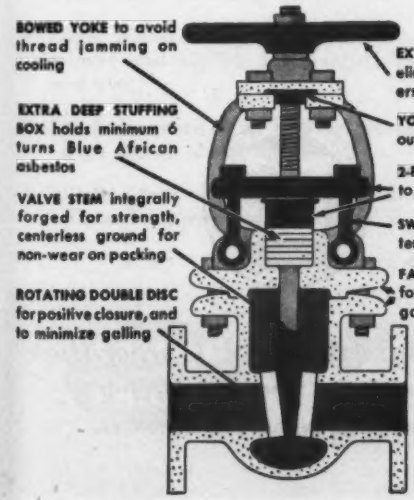
TOMPKINS and ANIK of SINGMASTER & BREYER

tell why they build Cooper Alloy stainless valves into their basic plant designs

Q. Gentlemen, precisely why do you buy Cooper Alloy valves?

FJT—With me, dependability is the main reason. My major concern is overall plant design, and frankly I don't have time to worry about every equipment detail. As specialists in designing and building "first-of-its-kind" processing plants, we need valves we can count on, and can "build in" as part of our original design. Cooper Alloy valves, we've found, fill that bill.

BA—From my point of view as a mechanical engineer, it's the Cooper Alloy valve *design* that appeals to *me*. It has extra features, like the extra-large handwheel, unique square compression of packing, bowed yoke, integrally forged stem, and others, all of which make for less maintenance and longer, more economical valve life.


BOWED YOKE to avoid thread jamming on cooling
EXTRA DEEP STUFFING BOX holds minimum 6 turns Blue African asbestos
VALVE STEM integrally forged for strength, centerless ground for non-wear on packing
ROTATING DOUBLE DISC for positive closure, and to minimize galling
EXTRA LARGE HANDWHEEL to eliminate need for "persuaders"
YOKE NUT REPLACEABLE without valve disassembly
2-PC. GLAND CONSTRUCTION to prevent scoring of stem
SWINGING EYEBOLTS for maintenance convenience
FAIRED BODY-BONNET FLANGES for equal stress and uniform gasket loading

A VALVE DESIGNED FOR STAINLESS!

The Cooper Alloy valve is not an adaptation of earlier brass and iron patterns. Cooper Alloy, with over 35 years of experience in handling stainless steel, created a valve *designed to be cast in stainless!* **Check the Special Design Features shown at left.**

As the little CA man below is saying: *"You can tell a Cooper Alloy Valve as far as you can see it!"* Write today for *your* copy of our folder "Design Factors In Stainless Steel Valves." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves *and fittings*, and their advantages. He can serve you promptly from local stocks.

COOPER ALLOY

Corporation • Hillside, New Jersey

VALVE & FITTING DIVISION

THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

No matter which *FINISH* you like—you can buy it in

MicroRold® QUALITY STAINLESS STEEL

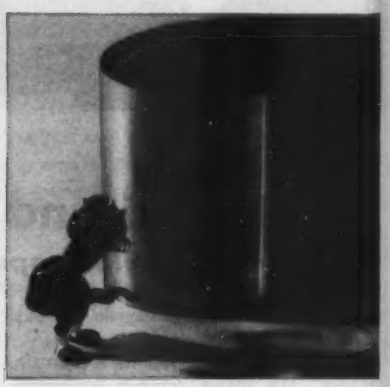
2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.

No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.

No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.



BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

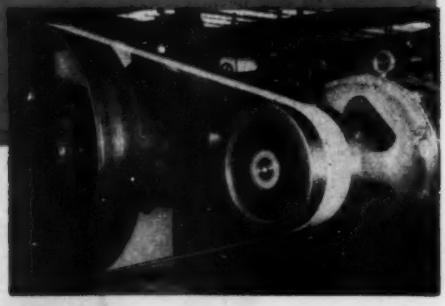
Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

Washington Steel *Corporation*

Producers of Stainless Sheet and Strip Exclusively

9-Z WOODLAND AVENUE, WASHINGTON, PA.



10 REASONS

why you should use this new revolutionary type flat belting!

- High Tensile Strength — and great coefficient of friction allows the use of narrower belts.
- Narrower belt widths — mean greater speed variation, more precise speed control.
- High Speed — belt speeds of 10,000 feet per minute and higher. Load capacities to 500 H.P. and over.
- Shock Resistant — its recoverable elasticity allows it to absorb shock loads.
- Oil Resistant — unaffected by machine and cutting oils, and temperature up to 160° F.
- Moisture Resistant—will operate in high humidity more efficiently than other types.
- Light weight — operates with a minimum of bearing pressure.
- More Production — less maintenance cost — with proper tension, it will eliminate take-ups.
- Nycor is especially recommended for cone drives—also used on short center drives with high pulley ratios.
- Nycor is an American made belt, a high quality product of Graton & Knight, the world's largest industrial leather manufacturer, known for its dependable products and service.

Send for more information on this amazing new revolutionary belt.

GRATON AND KNIGHT

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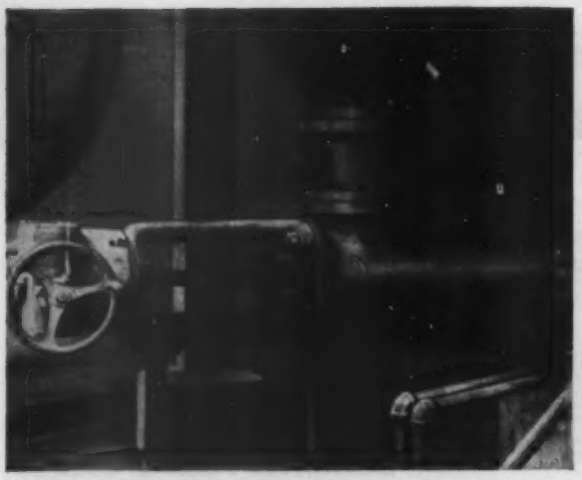
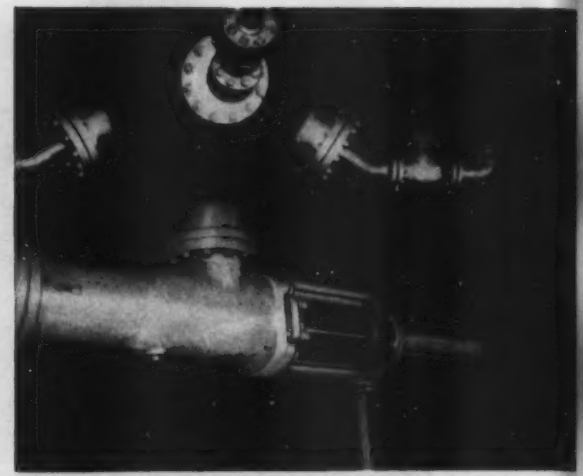
WORCESTER 4, MASSACHUSETTS

reduce costs of your product



● One of five 8" motor-operated Yarway Digester Valves at large Tennessee mill.



● One of seven 8" hydraulic-cylinder-operated Yarway Digester Valves at large Florida mill.

Motor-operated Yarway Digester Valve. Cut-away shows full discharge area for faster blowing.

YARWAY®

with Yarway Digester Valves

Here's how:

FASTER BLOW—Comparisons show that Yarway Digester Valves have *up to 100% greater discharge area* than some other valves of the same nominal size. This permits *faster discharge, lower pressure drop.*

CLEANER BLOW—*Steam purging is unnecessary,* since Yarway's seatless hollow-sliding-plunger design eliminates all pockets where wood chips or tramp material can hang up.

TIGHT SEAL—Yarway's *tight seal* (packing rings above and below inlet port), prevents loss of cooking liquor and insures thorough cooking of pulp. So—

REDUCED BLOWING TIME
means
MORE COOKS PER DAY
which means
GREATER OUTPUT OF PULP

All this adds up to—**LOWER PRODUCT COST**—for you!

PLUS ITEMS—Yarway Digester Valves may be controlled from any remote operating point. Choice of motor-unit or hydraulic-cylinder operation (see installation pictures).

Additional time and labor savings available with Yarway automatic lubrication unit.

Mills all over the world report *lower operating costs and increased production with Yarways.* Is yours one of them?

FREE BULLETINS— If you'd like full information on Yarway Digester Blow Valves and latest technical data on their selection and operation, write us today—

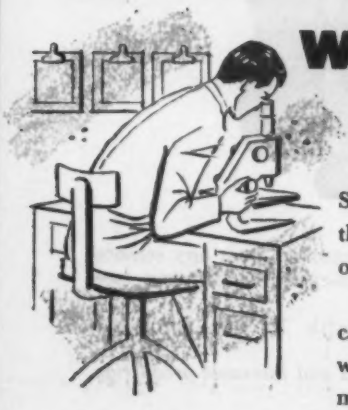
YARNALL-WARING COMPANY
149 Mermaid Ave., Philadelphia 18, Pa. ● BRANCH OFFICES IN PRINCIPAL CITIES

. . a good way to specify digester blow-valves

Microscopic Enemies?

Magnification 800

Layne Research Defends Your Well Water Supply



Shown here is an actual photograph of one of the many microscopic organisms which may occur in any type water supply.

Layne Research is called upon when well capacity is reduced. Layne Research finds out why. Production records, water analysis and microscopic examinations are some of the methods used to find the reason. Layne R search, thru years of experience in "recover lost water," selects the correct Laynite mate and method to restore well capacity.

IDENTIFY AND PRESCRIBE — th what Layne Research does for each individ well water problem.

Only Layne Offers Complete Service: *Research* • *Analysis* • *Design* • *Wells* • *Pumps* • *Maintenance* • *Engineering*

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WATER WELLS • VERTICAL TURBINE PUMPS • WATER TREATMENT

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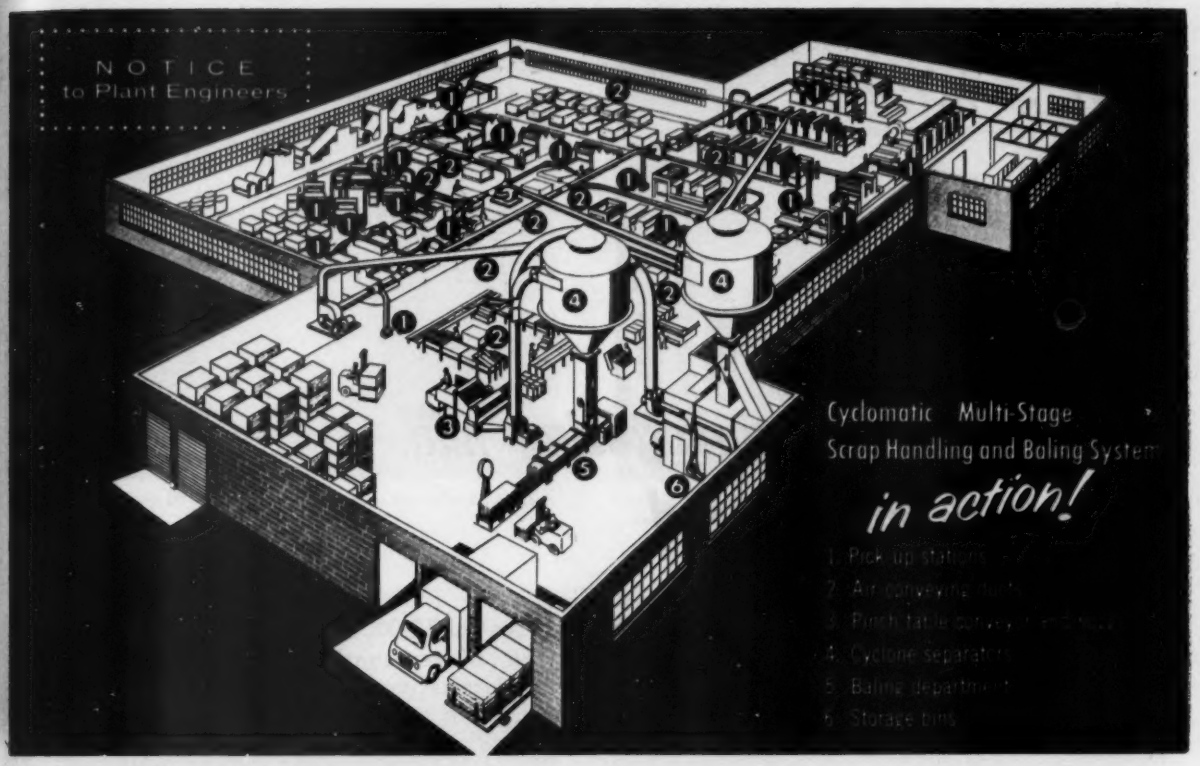
LAYNE ASSOCIATE COMPANIES THROUGHOUT THE WORLD



CYCLOMATIC® takes high labor cost out of scrap handling and baling—*automatically!*

Cyclomatic® Single-Stage Power Baling System

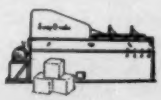
HERE'S WHAT IT DOES FOR YOU!

- Eliminates expensive manual scrap collection.
- Greatly reduces manpower.
- Reduces your scrap storage area by one-half.
- Removes scrap as fast as it accumulates.
- Reduces dirt and dust to minimum.
- Keeps working areas clean and free.
- Improves employee attitude.
- Produces bales up to 1500 lbs.; up to 72" long.
- Saves bale ties—only 5 required.
- Upgrades scrap value.

HORIZONTAL BALER

DOWN POWER BALER

HAND BALER


SCRAP-O-MATIC METAL BALER

Balemaster EC EAST CHICAGO MACHINE TOOL CORP.

Balemaster DIVISION OF
EAST CHICAGO MACHINE TOOL CORPORATION
4801 RAILROAD AVENUE • EAST CHICAGO, INDIANA • PHONE: EAST CHICAGO 7470

Feature articles

Crandon Paper's corrugating mill completely modernized

Modernized at a cost of $2,000,000, the Fort Madison mill produces 30,000 tons of corrugating medium. Among the highlights of the modernization program are the two-screw continuous Pandia digester and the elaborate conveying system handling flow of materials.

THE FORT MADISON, Iowa mill of Crandon Paper Mills Inc., renovated and modernized at a cost of $2,000,000, can produce approximately 30,000 tons of 9-point semi-chemical corrugating medium per year. The mill employs over 125 people and spends approximately $2,000,000 a year on wages and raw materials procurement. The modernization job was engineered by Roderick O'Donoghue & Co.

Pulpwood is drawn from an area within a radius of approximately 50 miles of Fort Madison. The cost of pulpwood amounts to approximately $600,000 per year. It consists largely of cottonwood, although substantial quantities of oak and other native species are also being used. The total pulpwood requirements are supplied by farmers who haul it in trucks in the form of logs 8 ft. long and up to 20 in. in diameter.

The mill staff consists of G. G. Copeland, general manager; T. A. Thayer, mill superintendent; E. G. Paulson, plant engineer; H. A. Thiede, office manager; P. W. Wilkerson, purchasing agent; W. G. Greiner, chief chemist; J. R. Nichols, instrument engineer; A. J. Cullen, chief electrician; F. J. Hayes, master mechanic, and M. F. Smith, power plant engineer.

C. A. Langenbach is woodlands manager; G. White is assistant woodlands manager, and A. D. Allyn is forester.

Sales manager is O. K. Krogfoss and sales service manager K. D. Carlson.

Wood yard and chip preparation

The pulpwood is hoisted from the trucks by a Model 54 Cary-lift loader equipped with lift fork attachment. The Model 54 loader has a capacity of 10,000 lb., is equipped with a four-wheel drive and a four-wheel steer and has a 4-ft. hydraulic forward reach. Another loader, Model C 54 with a capacity of 6000 lb., is used for maintaining log decks and feeding the logs to the mill.

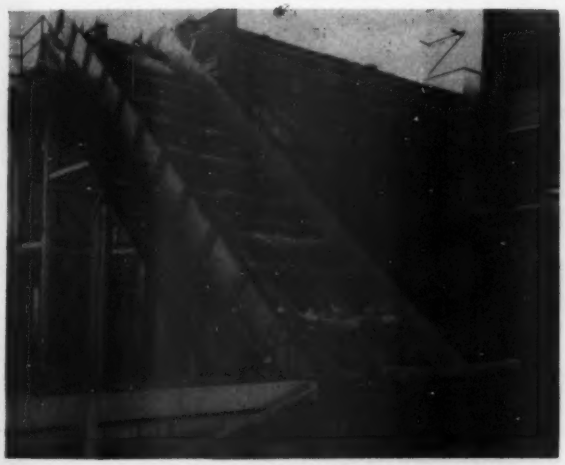
Pulpwood is stacked in piles 14 ft. high and 800 ft. long. It is reclaimed from these decks by a Model SP 254 W self-propelled rubber tired crane equipped with a ¾-cord LHD pulpwood grapple. The crane loads the logs crosswise onto trailers designed and built by Crandon to simplify the transfer of wood from the wood yard to the debarking station. The units are self-unloading with two continuous chains running the full length of the truck bed. Power to motivate the chains is supplied by an electric motor and power transmission unit mounted to the bed. The truck unit is backed up to an unloading table and the motor energized by connection through a section of cable tied to a standard outlet 440-v receptacle. The chain conveyor on the trailer moves the logs from the trailer to a sorting table, which is equipped with a variable-speed drive making it possible to separate one log at a time from the incoming supply. A single operator controls the whole operation. Logs are fed from the sorting table onto a horizontal cross conveyor, which in turn feeds the logs to the debarker.

This conveyor is furnished with sloping skirt guards to cradle the logs and travels at 70 fpm. Logs from this unit are discharged to a single-strand chain conveyor, which is the infeed unit to the 26-in. Cambio debarker. The debarker is equipped with two motors, one powering the rotor and the other — a two-speed motor — powering the feed works. Logs pass through the debarker at an average rate of about 75 lineal fpm.

The debarked logs are conveyed by a single-strand chain outfeed conveyor to a heavy-duty steel slat conveyor which travels at 160 fpm. A power-driven roll conveyor receives the logs from the slat conveyor, which transfers them to the jackladder by way of air-operated ejector arms. The jackladder, inclined at an angle of approximately 33° and operated at 60 fpm, consists of four strands of heavy-

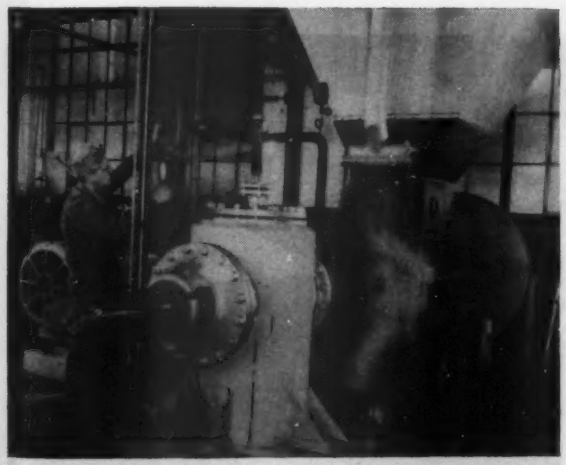
The Pettibone Cary Lift and Conveyor Systems Inc. infeed log deck.

Cambio debarker with infeed conveyor supplied by Soderhamn Machine & Mfg. Co.

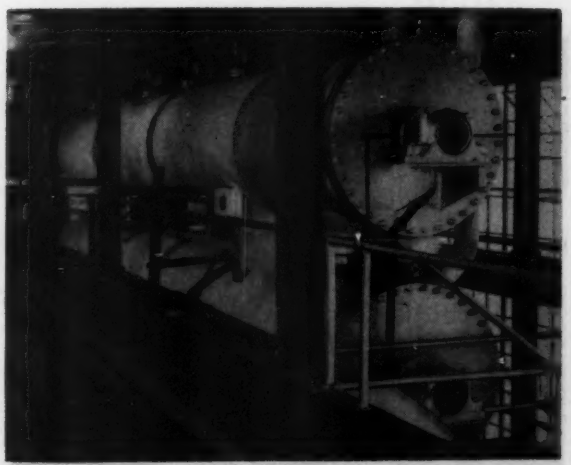


Conveyor Systems jack ladder, which feeds debarked logs into the 106-in. Murray chipper.

Concrete stave chip silos constructed by Marietta Concrete Corp., with Conveyor System's infeed and outfeed conveyors.



The 15-in. tapered screw feeder made by Black-Clawson Co. is equipped with a 100-hp variable speed drive.



The two 42-in. diameter, 39-ft. long Pandia continuous digester tubes made by Black-Clawson have a capacity in excess of 100 tons/day.

Black-Clawson's live bottom bin receives cooked chips from the continuous digester.

Bauer Bros. pressafiners driven by 150-hp motors extract black liquor from the cooked chips.

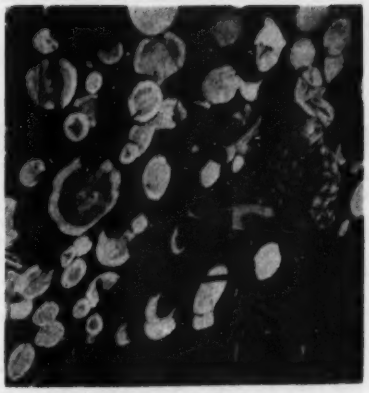
Bauer refiners driven by 400-hp motors receive dewatered pulp from the pressafiners and discharge it into the refined stock chest.

Wet end of the paper machine; also shown are the Miami jordans supplied by Black-Clawson and the screens made by Trimbey Machines Inc.

View of Black-Clawson's Rollflyte reel.

Moore & White's four-drum 1000-fpm slitter-winder.

T. A. Thayer
Mill Superintendent



C. A. Langenbach
Woodlands Manager

W. G. Greiner
Chief Chemist

duty log haul chain provided with spaced dogs.

Logs are discharged from the jack-ladder to a 24-in. wide extra heavy-duty flat belt conveyor operating at 250 fpm and discharging to a 104-in., 12-knife chipper driven by a 700-hp slip ring motor through a belt drive.

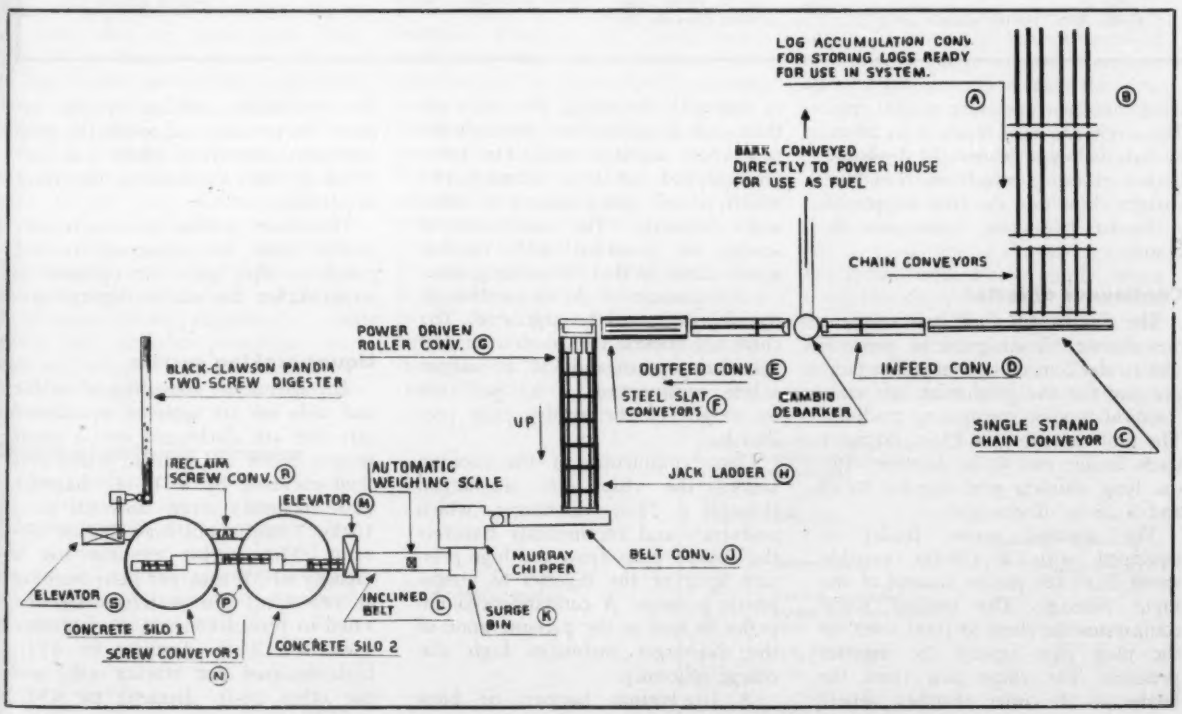
The chipper disc is of heavy steel plate, hot rolled and stress relieved. The chipper pulley is of the fly-wheel type, 76-in. diameter by 32-in. face. Chipper disc and pulley are dynamically balanced for a maximum belt speed of 7600 fpm. Full-load speed of the chipper is 340 rpm.

The 24-in. diameter chipper spout is of the "V" type design. It is provided with a hinged cover to eliminate log jams. The chipper is provided with heavy-duty SKF spherical roller bearings mounting in a cast steel thrust bearing housing and a high-tensile cast iron housing at the expansion end.

Chips discharge from the bottom of the chipper into a surge bin fitted with three 14-in. screws to form a live bottom. These secrews are capable of handling 12,000 cu. ft. of chips per hour. They discharge onto a 36-in. troughing belt conveyor inclined at 20° and running at 300 fpm. The belt is furnished with an automatic weighing unit.

A belt-type centrifugal discharge bucket elevator, equipped with a double row of 20- by 10- by 10-in. steel buckets, spaced at 30-in. centers, receives the chips from the troughing belt conveyor and elevates them approximately 70 ft. at a speed of 480 fpm. Here, a 24-in. diameter screw conveyor operating at 106 rpm receives the chips and discharges them into either of two storage silos.

The silos are of precast concrete stave construction 24 ft. in diameter and 55 ft. high. Each silo has two 20-in. by 30-in. louvered type inspection doors. The silo at the bottom terminates into a 60°, 5/16th-in. steel plate cone with its 8-ft. diameter outlet supplying a 13-ft. diameter rotary table feeder. The feeders have a capacity of 3600 cu. ft. per hour each and delivers chips to an 18-in. diameter



Diagramatic presentation of Conveyor System Inc.'s conveying equipment handling flow of materials.

Principal equipment in operation at Crandon Paper's Fort Madison mill

Wood yard and chip preparation

Cambio debarker (1), 26-in.	Soderham Machine Mfg. Co.
Cambio infeed conveyor (1), single-strand	Conveyor Systems Inc.
Cambio outfeed conveyor (1), single-strand	Conveyor Systems Inc.
Cary-lift loaders (2), Model 54 and Model C 54	Pettibone, Mulliken Corp.
Centrifugal discharge bucket elevator, equipped with double row of steel buckets	Conveyor Systems Inc.
Chip feed bin (1), live bottom with three 16-in. screws	Conveyor Systems Inc.
Chipper (1), 104-in. diameter disc, 12 knives, driven by 800-hp motor	D. J. Murray Mfg. Co.
Chip silos (2), solid concrete stave construction, 24-ft. diameter, 55-ft. high	Marietta Concrete Corp.
Flat belt conveyor (1), 24-in. wide	Conveyor Systems Inc.
Jackladder (1), 4-strand chain, with spaced dogs	Conveyor Systems Inc.
Log-feeding conveyors (2), three-strand chain	Conveyor Systems Inc.
Log-feeding conveyor (1), single-strand chain, with sloping skirt guards	Conveyor Systems Inc.
Reclaiming screw conveyor (1), 18-in. diameter	Conveyor Systems Inc.
Roll conveyor (1), power-driven rolls, equipped with air-operated ejector	Conveyor Systems Inc.
Rotary table feeders (2), 13-ft. diameter, 3600-cu. ft. per hour capacity each	Link-Belt Co.
Slat conveyor (1), 160-fpm.	Conveyor Systems Inc.
Screw conveyors (2), 24-in. diameter	Conveyor Systems Inc.
Troughing belt conveyor (1), 36-in. wide, equipped with automatic weighing unit	Conveyor Systems Inc.

Continuous digestion, liquor preparation and stock preparation

Beater (1) (old equipment), 2000-lb. capacity	Downingtown Mfg. Co.
Blow tank (1), 7-in. live bottom, equipped with variable speed drive screws	Black-Clawson Co.
Broke beater (1) (old equipment), 1000-lb. capacity	Sprout, Waldron & Co. Inc.
Bucket elevator (1), continuous, 10 by 7, 16 tons per hour capacity	Conveyor Systems Inc.
Consistency regulators (2), size No. 1 and No. 2	De Zurik Corp.
Feeder drive, 100-hp variable speed	Black-Clawson Co.
Feed hopper	Black-Clawson Co.
Instrument control panel, Pandia type	Black-Clawson Co.
Jordans (3), Miami, two 250-hp and one 150 hp	Black-Clawson Co.
Pandia digester, two screw continuous, 150 air dry ton per day capacity, equipped with a 15-in. diameter screw feeder, two 42-in. diameter stainless steel digester tubes and a 28-in. discharger	Black-Clawson Co.
Pressafiners (2), 150 hp	Bauer Bros. Co.
Refiners (2), driven by 400-hp motors	Bauer Bros. Co.
Refiner (1), Claflin, 150-hp	Emerson Mfg. Co.
Refined stock chest, tile-lined	Stebbins Engineering & Mfg. Co.
Screens (2)	Trimbey Machines Inc.
Screw conveyor (1), 14½-in. diameter	Conveyor Systems Inc.
Screw conveyors (2), 12-in. diameter	Conveyor Systems Inc.
Screw conveyor (1), 14-in. diameter, capacity 23 tons per hour of soda ash	Conveyor Systems Inc.
Screw conveyor (1), 9-in. diameter, capacity 1.5 tons per hour of sulfur	Conveyor Systems Inc.
Soda ash storage silo (1), 25-ft. diameter, 45-ft. high. Air-Cell stave construction	Marietta Concrete Corp.
Sulfur burner (1), rotary, 36-in. diameter, with 6-ft. diameter steel tank combustion chamber, equipped with mechanical feed, 215-435 lb. per hour capacity	Glens Falls Machine Works
Sulfur dioxide absorption tower lining	Stebbins Engineering & Mfg. Co.
Sulfur storage silo (1), 16-ft. diameter, 35-ft. high, Air-Cell stave construction	Marietta Concrete Corp.
Tile chest and linings	Stebbins Engineering & Mfg. Co.

Paper machine

Paper machine (reconstructed), comprising a 143-in. fourdrinier, 2 presses, 63 dryers and a calender stack	Downingtown Mfg. Co.
Couch pit, tile-lined	Stebbins Engineering & Mfg. Co.
Reel (1)	Black-Clawson Co.
Tile chests and linings	Stebbins Engineering & Mfg. Co.
Winder (1), 4-drum slitter-winder, 1,000 fpm	Moore & White Co.

Steam and power

Boilers (3) (old equipment), Stirling, 500-hp, 200-psi operating pressure	Babcock & Wilcox Co.
Power generator, 2500-kw.	General Electric Co.

screw conveyor operating at 100 rpm. The screw conveyor feeds to an 18-in. by 8-in. belt-type centrifugal discharge bucket elevator, which in turn discharges chips into the feed hopper of a Pandia two-screw continuous digester.

Continuous digester

The Pandia Chemi-Pulper continuous digester is designed to produce 150 air-dry tons of neutral sulfite pulp per day for the production of semi-chemical 9-point corrugating medium. The unit consists of a 15-in. diameter screw feeder, two 42-in. diameter, 468 -in. long stainless steel digester tubes and a 28-in. discharger.

The tapered screw feeder is equipped with a 150-hp variable speed drive for precise control of the input tonnage. The tapered screw compresses the chips to form a seal in the plug pipe against the digester pressure. The chips pass from the feeder to the inlet chamber, where steam and cooking liquor are injected to mix with the chips. The chips are then cooked as they pass through the two 42-in. digester tubes. The tubes are equipped with time control screws which provide good mixing of chips and chemicals. The time control screws are provided with variable speed drives so that the cooking time, i.e. the passage of the chips through the digesters, can be regulated. The chips are cooked for 20 min. at 150 psi steam pressure and 350° F. Sodium sulfite consumption is 15 per cent by weight of the air-dry pulp produced.

Upon completion of the cooking action, the chips are discharged through a 28-in. discharger, which uniformly and continuously transfers the cooked pulp from the high-pressure zone of the digester to atmospheric pressure. A constant-speed impeller located in the pressure zone of the discharger maintains high discharge efficiency.

A live-bottom hopper, or blow tank, receives the cooked chips from the continuous cooking system, releases the pressure and moves the pulp into screw conveyors, where it is conveyed to two pressafiners operating in parallel.

The entire cooking process is controlled from an instrument control panel, so that only one operator is required for the entire digester system.

Liquor-making system

The chemicals, consisting of sulfur and soda ash are received in railroad cars that are discharged into a small hopper below the railroad tracks and then elevated by a 14-in. diameter (20° inclined) screw conveyor to a 10 by 7 continuous brass bucket elevator. This bucket elevator has a capacity of 16 tons per hour running at 125 fpm. The materials are elevated to precast concrete stave storage silos; one 25-ft. diameter by 45-ft. high is used for storing ash, and the other 16-ft. diameter by 45-ft.

(Continued on page 490)

Cathodic protection in pulp and paper mills*

JOSEPH A. LEHMAN**

Many mills are needlessly spending thousands of dollars annually because of corrosion. Much of this waste can be prevented by the proper use of cathodic protection.

WIDESPREAD RECOGNITION of cathodic protection as one of the means for controlling corrosion on all types of buried and submerged metal structures has directed increasing interest toward its application at pulp and paper mills.

Because of manufacturing methods and equipment peculiar to the paper industry it is not uncommon to find that many plants are needlessly spending thousands of dollars annually because of corrosion. Frequently corrosion failures not only cause large expenditures for replacement of equipment, but also result in costs due to down-time and loss of productive capacity. Much of this waste can be eliminated by the proper use of the cathodic protection principle.

Intense corrosive environments and complex physical conditions have, in the past, discouraged the application of cathodic protection to paper mill equipment. However, fundamentals of cathodic protection are now well established. Availability of more suitable engineering materials for cathodic protection systems encourage its use for corrosion problems heretofore considered as doubtful applications.

Causes of galvanic corrosion

The fundamental causes of galvanic corrosion are simple. If two different metals, say a copper pipe and a black iron pipe, buried in a moist soil (or submerged in water) are metallically connected together, an electric current will flow. This current will flow from the iron pipe into the soil, through the soil to the copper pipe and through the metallic connection back to the iron pipe, thus completing the circuit. This electric current is the result of electro-chemical action between the surfaces of the pipes and the chemicals in the soil. Corrosion of the iron pipe occurs due to the flow of electrical current from its surface into the soil (or electrolyte). A protective effect is experienced on the surface of the copper pipe. (Fig. 1).

This same electro-chemical action is the basis for the common dry cell battery. Current is "generated" merely by the action between the zinc battery container and a center carbon rod. In the dry cell battery the space between the center rod and the zinc container is filled with selected materials so as to provide an excellent electrolyte, and also to prevent polarization of the center carbon rod. As in the case of the copper pipe connected to the black iron pipe, when a wire is connected between the carbon rod and the zinc battery container, a current will flow through the wire from the carbon rod—or positive terminal of the battery—to the zinc container—or negative terminal of the battery (this is called the external circuit). Within the battery (or the internal circuit) the current flow is from the zinc through the electrolyte to the carbon rod. Constant use of a dry cell battery will cause corrosion of the zinc container, and eventually the electrolyte will leak and the battery becomes useless (Fig. 1).

It should be noted that corrosion always takes place at the point or area where current leaves a metal surface and enters an electrolyte. This point or area is called the anode. Corrosion is not experienced on the area where current is collected on a metal surface from the electrolyte. This area is called the cathode.

Anodes and cathodes not only occur when dissimilar metals are interconnected within an electrolyte, but also occur on a single type metal due to variations in the environment and metal itself. For example, when a pipeline crosses alternately wet and dry soils, the steel surfaces in the wet areas become anodic to those surfaces in the dry areas. Thus corrosion will take place even though

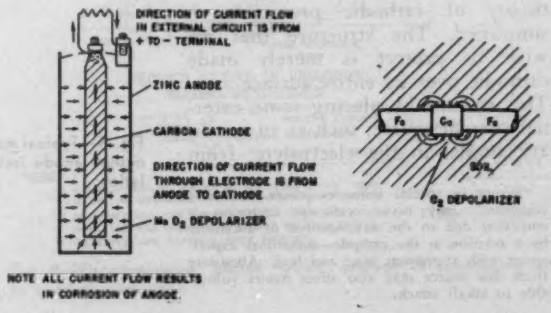

DIRECTION OF CURRENT FLOW IN EXTERNAL CIRCUIT IS FROM + TO − TERMINAL
ZINC ANODE
CARBON CATHODE
DIRECTION OF CURRENT FLOW THROUGH ELECTRODE IS FROM ANODE TO CATHODE
MnO_2 DEPOLARIZER
NOTE ALL CURRENT FLOW RESULTS IN CORROSION OF ANODE.
Fe
Cu
Fe
H_2O
O_2 DEPOLARIZER

Fig. 1 Corrosion of dissimilar metals.

*Presented at the A. I. E. E. Pulp & Paper Industry Conference.

**Division engineer, Electro Rust-Proofing Corp., Belleville, N. J.

the same kind of metal is used throughout (Fig. 2). Other types of differences in the electrolyte such as variations in oxygen concentration, differences in soil or water composition, temperature variations, velocity variations (when the electrolyte consists of flowing liquid), nonuniformity of surface conditions, etc., can similarly produce anodic and cathodic areas.

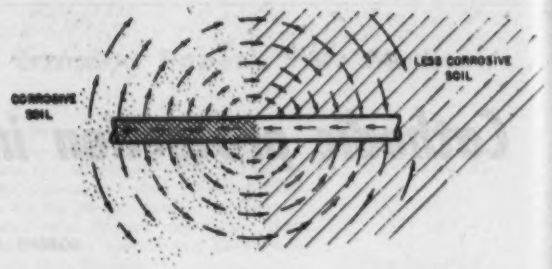


Fig. 2—Corrosion by dissimilar soils.

Local and long-line cell corrosion action

The corrosion systems of anodes and cathodes are generally classified in two major categories:

(1) Local cell; a cell, the emf of which is due to differences of potential between areas on a metallic surface in an electrolyte. The potential differences may be due to inclusions, lack of homogeneity, varying concentration of the solution with respect to oxygen or metal ions, etc.

"Local action" is defined as corrosion caused by the flow of electric current between points on a metal surface.

(2) Long-line cells (or current); current (positive electricity) flowing through the electrolyte from an anodic to a cathodic area that returns along the metallic structure. Usually used only where the areas are separated by considerable distance (Figs. 2 and 3).

The local cell corrosion action is usually highly concentrated and exhibits itself in the form of pitting on the metal surface. In any corroding system the effects of the two types of cells are frequently superimposed one upon another. The long-line corrosion cells are easily overcome by cathodic protection, while the concentrated local cell action frequently requires high protective current densities and more exacting engineering to control its effects.

Considering the fact that corrosion occurs at the anode (where current leaves the metal surface and enters the electrolyte) and no corrosion occurs at the cathode* (where current is collected upon the metal surface from the electrolyte), the theory of cathodic protection is simplified. The structure that we wish to protect is merely made cathodic over its entire surface area. This is done by placing some external current source, such as an auxiliary anode, in the electrolyte, from which current is "driven" and collected on the protected structure's surface. The design of specific cathodic protection systems is not quite simple.

What anodes to use?

One of the most important problems encountered in the design of any cathodic protection system is the choice of material to be used for the "auxiliary anode". Cathodic protection anodes are divided into two major classifications:

(1) Galvanic or sacrificial anodes
(2) Anodes for use with "impressed" currents, or non-sacrificial anodes

When using galvanic anodes the corrosion engineer merely utilizes the principle of corrosion between dissimilar metals to obtain the protective current. As stated previously, when black iron or steel is electrically connected to copper and both are placed in an electrolyte, a current will flow from the steel through the electrolyte to the copper, therefore, the steel is "protecting" the copper. This protective effect is produced because steel is more electro-negative than copper in the electromotive series. Therefore, we may conclude that any metal may be cathodically protected by coupling it with metal more electro-negative than itself. For example, zinc, aluminum and magnesium may be readily used to protect such metals as steel, lead and copper. Naturally in the majority of instances in industry we are attempting to protect steel or other alloys of iron; thus zinc, aluminum and magnesium are frequently used as galvanic anodes.

By observing the difference in po-

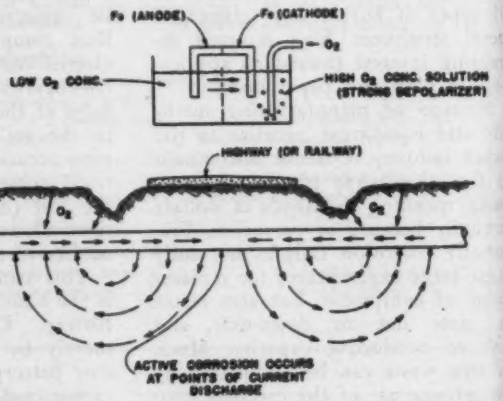


Fig. 3—Corrosion due to differential aeration.

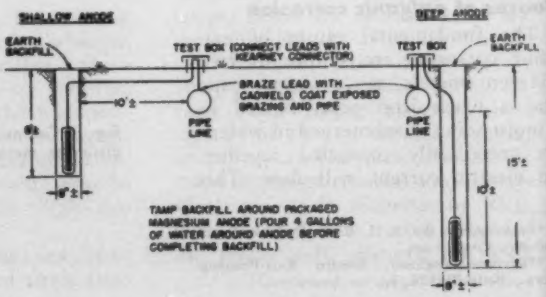


Fig. 4—Typical magnesium anode installation

*Except in special instances where "cathodic corrosion" may occur, cathodic corrosion is corrosion due to the development of alkalinity by a reaction at the cathode—sometimes experienced with aluminum, zinc and lead. Alkalinity from this source may also affect paints vulnerable to alkali attack.

tential between steel or iron and metals frequently used for galvanic anodes, it becomes evident that usually not more than 0.4 to 1.2 volts can be produced. Therefore, when the electrolyte resistance is high or if protective current requirements are large, "impressed" currents may be utilized for cathodic protection*.

Usually the source for such impressed currents is a selenium stack rectifier.** The anodes used in such systems are designed of materials to fit the specific environmental conditions. Usually such anodes are made of aluminum, carbon, graphite, platinum and high silicon (14.5 per cent) cast iron. These particular materials are generally used for impressed current anodes due to their lack of undesirable corrosion by-products or relatively slow deterioration rate.

Any anodes utilized in the cathodic protection system must be ultimately replaced. When utilizing galvanic anodes the expected life of the anode can range anywhere from one to 20 years or more depending on the specific characteristics of the individual cathodic protection systems. If aluminum anodes are used in an impressed current system, the life of the anode material is generally designed to be from one to five years. Utilizing graphite or high silicon cast iron, cathodic protection systems can be designed to have an effective anode life of from five to thirty years or more. When selecting the type of anode to be used in any particular cathodic protection system, economics as well as protective current requirements are the factors which dictate the choice (Figs. 4 and 5).

*There are exceptions to this depending on power availability, particular design requirements, etc.

**Newly developed silicon cells are becoming more popular as cathodic protection rectifying elements. These new cells permit a 20%-to-50% reduction in size and a 10%-to-40% reduction in weight of the rectifier unit as compared with selenium plates.

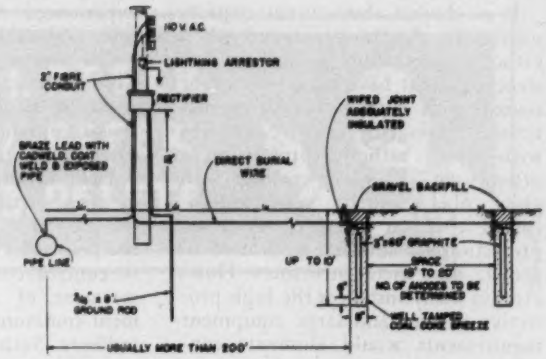


Fig. 5—Typical pipe line rectifier installation; remote graphite anode bed.

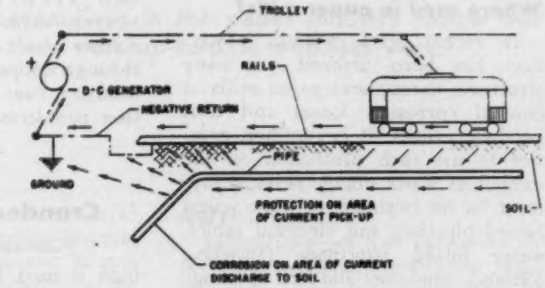


Fig. 6—Low-resistance return path for the stray currents.

Current requirements

Probably the most perplexing problem encountered in the design of a cathodic protection system is the determination of the current required for adequate protection. There is no basic "rule of thumb" that can be applied in this regard. The only feasible way to determine such requirements is by suitable field investigations. To illustrate the fallacy in "guessing" at current requirements, experience has shown that to protect a bare steel structure in soil, current requirements may range from 1 to 3 ma/sq. ft., whereas to protect the same bare steel in sea water the current requirements would be from 5 to 8 ma/sq. ft., while a well-coated steel structure in soil may easily be protected at a current density as low as 0.01 ma/sq. ft. or less. Frequently, the velocities of liquid electrolytes over a metal surface have a tremendous bearing on the current required for proper corrosion control. It is not uncommon to utilize current densities as high as 100 ma/sq. ft. to protect the interior surfaces of condenser and heat exchanger water boxes.

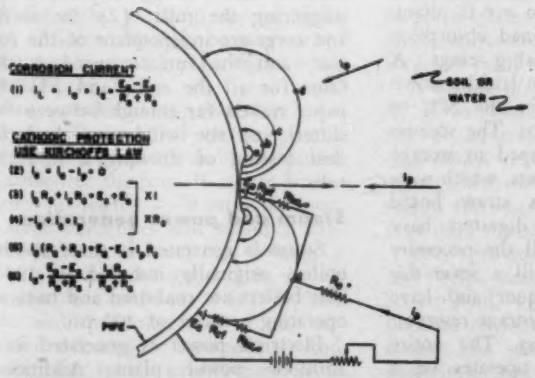


Fig. 7—Corrosion current flow lines and equivalent cathodic protection circuit.

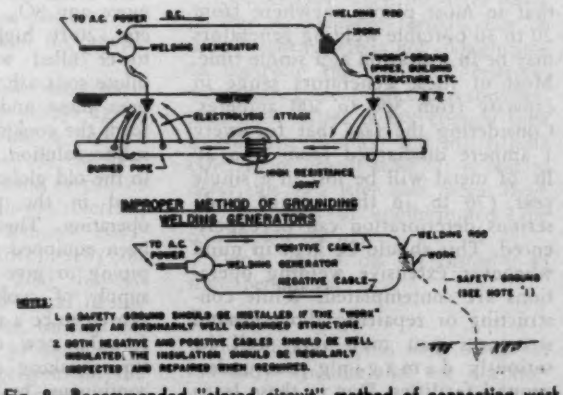

TO A.C. POWER
WELDING GENERATOR
WELDING ROD
WORK
ELECTROLYSIS ATTACK
BURIED PIPE
HIGH RESISTANCE JOINT
IMPROPER METHOD OF GROUNDING WELDING GENERATORS
POSITIVE CABLE
NEGATIVE CABLE
SAFETY GROUND (SEE NOTE 1)
NOTES:
1. A SAFETY GROUND SHOULD BE INSTALLED IF THE "WORK" IS NOT AN ORDINARILY WELL GROUNDED STRUCTURE.
2. BOTH NEGATIVE AND POSITIVE CABLES SHOULD BE WELL INSULATED. THE INSULATION SHOULD BE REGULARLY INSPECTED AND REPAIRED WHEN REQUIRED.

Fig. 8—Recommended "closed circuit" method of connecting work to welding generators.

It is obvious that current requirements are greatly minimized when cathodic protection is utilized on structures that have been painted or coated with corrosion-resistive materials. Among the resistive coatings with which cathodic protection is often used are vinyl coatings and glass fiber and/or asbestos-reinforced coal tar enamels. Cathodic protection can and has been used to protect bare metal structures. However, in many instances the high protective current and large equipment requirements would eliminate consideration of cathodic protection by economic and/or practical factors.

Where used in paper mills?

In recent years cathodic protection has been utilized on many structures throughout paper mills to control corrosion losses and thus produce profits. It is common practice to use such protection on the interior of water storage tanks, equipment for the treatment of white water, buried pipelines and electrical cables, water intake structures (traveling screens), condenser and heat exchange water boxes, etc. These are only some of the possible applications.

Galvanic corrosion is not the only effect which may be causing destruction of metallic structures. Rapid and extensive corrosion of buried pipelines and electrical cables can occur when "leakage" from dc electrical equipment (such as motors, rectifiers, and welding generators) is prevalent. This has been found to be a major problem in many large industrial plants such as pulp and paper mills. These "stray currents" use buried pipelines and cables as a return or negative bus. Where such currents are picked up or collected by the buried structures a protective effect is experienced. However, if these stray currents are discharged from the buried structures severe corrosion or electrolysis is experienced. It is not uncommon to find that in most plants anywhere from 20 to 30 portable welding generators may be in operation at a single time. Most of these generators range in capacity from 300 to 500 amperes. Considering the fact that for every 1 ampere discharged from iron 20 lb. of metal will be lost in a single year (70 lb. in the case of lead) serious deterioration can be experienced. This should be kept in mind whenever extensive welding operations are contemplated. While constructing or repairing above-ground structures you may very well be seriously damaging your underground facilities. Due to these large stray currents some operators have experienced failure of their pipelines and cables within a period of a few weeks, or even several days. This problem can generally be overcome by furnishing a suitable low resistance return path for the stray currents (Figs. 6 and 8).

Field investigations are continually in progress to determine the technical economic feasibility of utilizing the principles of cathodic protection to control corrosion on a wide assortment of machines and equipment common to the pulp and paper industry. Such testing work may ultimately reveal practical methods of retarding or preventing corrosion of such structures as fourdrinier screens, cylinder mold wire, pulp washer vats (wire), etc. Only through cooperative testing with the industry can these complex corrosion problems be resolved.

Crandon Paper's mill

(Continued from page 486)

high is used for sulfur storage. The precast concrete staves for these two silos are of Air-Cell stave construction, a light-weight aggregate with the insulation equivalent of 15 in. of solid concrete.

The bottoms of these silos are arranged to feed two inclined screws, a 14-in. diameter screw inclined at 30° for transporting soda ash at the rate of approximately 23 tons per hour to a mixing tank and a 9-in. diameter screw inclined at 11° to handle approximately 1.5 tons per hour of sulfur to the sulfur burner.

The 36-in. diameter by 8-ft. self-cleaning rotary sulfur burner, provided with a 6-ft. diameter by 10-ft. steel tank combustion chamber, is equipped with a mechanical feed for feeding dry sulfur. Its capacity is 435 lb. of sulfur burned per hour.

The hot SO_2 gas, first washed in a stainless steel scrubbing tower to remove any SO_3, goes to a 6-ft. diameter, 20-ft. high tile-lined absorption tower filled with Rashig rings. A dilute soda ash solution trickles down over these and absorbs the SO_2 to form the cooking liquor. The sodium sulfite solution is pumped to storage in the old globe digesters, which were used in the previous straw board operation. These old digesters have been equipped with all the necessary piping to give the mill a seven-day supply of cooking liquor and have proven to be a useful storage reservoir for the new operation. The entire liquor-making system operates on a continuous basis and is controlled entirely by instrumentation.

Stock refining

Cooked chips from the cooking system are fed to two No. 460 pressafiners by means of a stainless steel screw conveyor that is equipped with a porous plate bottom to permit the removal of excess cooking liquor at this point in the flow sheet. Additional wash water is added to the cooked stock to make up for spent liquor removed in the screw conveyors. The pressafiners are each driven by two 150-hp motors and are fed by short sections of 12-in. screw conveyor. The units are protected by permanent magnets installed in the feed chutes. Pressed stock from the pressafiners contains about 60 per cent solids and flows by gravity to two No. 410 refiners, which also operate in parallel. Each refiner is driven by two 400-hp 2300-v motors.

Refined stock from the refiners is diluted and stored in a new refined stock chest, from whence it is drawn to the paper machine room.

Broke from the paper machine is repulped in a 1000-lb. broke beater.

A consistency-regulating unit regulates the broke pulp returning to the system, and a second regulating unit controls the new pulp stock being sent to the paper machine. Before passing through two screens en route to the headbox of the paper machine, the pulp is given a further light refining step in two 250-hp Miami jordans, one 150-hp Miami jordan and one 150-hp Claflin refiner.

The paper machine

The paper machine is a reconstructed unit comprising a head box, and slice, a 140-in. wide wire with suction couch and lump breaker roll, two presses, 63 dryers of 48-in. diameter and a calender stack.

Equipment following the calender consists of a reel and a four-drum 1000-fpm. slitter-winder.

The advantages claimed for the four-drum slitter-winder are: (1) it renders interweaving impossible by staggering the rolls; (2) the shafts and cores are independent of the roll size, and the surface speed is the same for all the rolls, and (3) the paper travels far enough between the slitters and the winder to shed the dust instead of drawing it into the rolls.

Steam and power generation

Steam is generated in three 500-hp boilers originally installed in 1921. The boilers are coal-fired and have an operating pressure of 200 psi.

Electrical power is generated in a 2500-kw power plant. Additional power amounting to 2000 kw. is purchased from public utility.

How to accomplish more with less work

JACK E. BEDFORD

Successful, busy executives in the paper industry follow this formula to keep their work up-to-date with less work.

TOP MANAGEMENT and middle-management men in the paper industry who keep up-to-date on their work follow a simple formula. This idea keeps their schedule current and is flexible enough to make it easy to handle unexpected situations that develop without disrupting the complete routine.

Successful paper industry executives have followed this plan for a long time. It is not new — it is time-tested as a technique of modern management. The formula has these three parts:

1. Refer
2. Defer
3. Delete

Refer

When an executive refers a duty to someone else in the organization, it can be a time-saver for everyone. This can be done to avoid a time-wasting task, to bring special skills and abilities into the picture, or to train another man to take on new responsibilities.

For instance, a top executive in a paper mill is called on to give a speech. It is an honor and good public relations for the firm. It cannot be deferred or deleted — it must be done.

Some executives will spend a day, two days or a week in writing a speech. It will be good. But, in 20 minutes or a half-hour it is over. The time and the dollar cost of this executive task may be tremendous. And during this speech-writing time many more important tasks and decisions may be deferred.

However, a paper mill executive who follows the management formula will refer this to someone else. It may be the public relations department, the advertising department or a ghost writer who works on a fee basis. By referring the job to someone else, the executive has a day, two days or a week that can be devoted to top level management decisions that will build profits for the company.

Another time when it is best to refer the task to someone else is for executive development. For instance, a production schedule or a sales budget is needed. In deciding whether to do it himself or to refer it to another man, the time element will enter the picture. The top executive knows he can do the job quickly and efficiently. He is better qualified than anyone else in the firm to handle the task.

When the executive refers the work to someone else, however, he is providing executive development. The person who is assigned the job grows in management stature. He learns how to prepare the budget or schedule. He gains self-confidence, and his loyalty increases many times.

A maxim of successful management is: When two partners always agree, one is unnecessary. This is another time when referral may be the best management strategy. Some executives follow the practice of always referring important decisions to someone else.

This provides another viewpoint and helps make the final decision better. And, with the referral of the decision to someone else, the top executive can study the problem more objectively and perhaps provide the necessary checks and balances needed for wise management.

Defer

Successful paper mill executives do not "put off" until tomorrow tasks that need to be done today. Yet, on every executive's daily schedule there are items that do not have a deadline. These are the items that can be deferred to provide more time for the "must" items and special situations that do develop during the day.

For instance, many tasks facing an executive are in the "when-I-have-time" category. A sales budget, due the first of December, for instance, might be on an executive's schedule in October. He thinks about it, but because there is not much urgency he puts off actually doing it.

This is not what is meant by defer. Each day a task is deferred this way it takes time. It uses up a certain amount of concentrating time of the executive each day it is deferred. A better way of handling this is to defer it to some specific date in advance of the first of December deadline.

Another time when the defer phase of this management formula can be used is when there is not enough time to complete the job. For instance, some management tasks take considerable time. There is not enough time to complete this job and still handle other more urgent work. It is best to defer this to a later date, when there will be plenty of uninterrupted time to complete the job.

Don't "put it off". Transfer it to some better time.

Delete

Every executive has some things on his daily schedule that are not necessary. Some are tasks that have

(Continued on page 501)

Some of the more recent uses of chemicals in the manufacture of wood pulp

WARREN BEAZLEY*

Part III—Pulping with ammonia base acid

IN THE PAST 15 years the cost of pulpwood has just about tripled. Concurrent with this increase in cost has come far greater competition for the available wood. These two facts have combined to force sulfite pulp mills to use species of wood that formerly were said to be unsuitable for pulpmaking.

One of the so-called undesirable wood species is jack pine — in fact pines in general, such as white pine and red pine, are included in this category. In the northern parts of Canada there are appreciable quantities of jack pine available; in other parts of the country there are sawmills sawing large quantities of white pine and red pine. These sawmills have mill waste in the form of slabs and board ends that could be converted into chips for pulp production.

Research on the part of several different laboratories and pulp mills has established that if the conventional calcium base sulfite acid is used there is serious trouble when attempts are made to cook the pines: pulp yields are low, rejects in the form of uncooked chips are high, the pulp is dirty, and bleaching costs are high.

It was soon discovered that if very young wood is used or, on the other hand, if only slab wood from the outer part of the pine tree is used, pulping results were quite good. However, the inner part of the logs, called the heartwood, behaves very poorly in the digester — as do older trees that contain a relatively higher percentage of heartwood.

It should be noted that these conditions apply to the sulfite process where calcium base acid is used. In the sulfite process the cooking acid is a mixture of sulfurous acid and a solution of an alkali metal or alkaline earth bisulfite. The cheapest alkali or alkaline earth is, of course, calcium. Thus most sulfite mills operate with what is called a calcium base acid — in other words, a mixture of calcium bisulfite and sulfurous acid. The metal, of course, could be magnesium or sodium, as it is in some mills. It could be lithium, or barium, or potassium if we could afford it.

It could also be ammonia, which we can afford. With ammonia we can cook jack pine quite readily. An ammonia base sulfite acid is capable of producing acceptable pulp from jack pine — as well as from other woods.

Advantages of ammonia base sulfite liquor

Over and above the benefits to be derived in pulping pines by ammonia base acid, there are gains to be made in the pulping of other woods. Among the benefits claimed are the following:

1. Rapid penetration resulting in shorter cooking cycles or lower cooking temperatures.
2. Advantages in pulping hardwoods.
3. Lower steam consumption.
4. Better control over chemical composition of cooking acid.
5. No scale formation.
6. No sludge in acid—less erosion of equipment and cleaner pulp.
7. Lower rejects as screenings.
8. Lower bleach demand.
9. Longer life of absorption towers.
10. Decreased labor costs.
11. Increased acid capacity.
12. More easily evaporated waste liquor, which is assuming increasing importance in connection with prevention of stream pollution.

Not all users of ammonia can necessarily obtain or take advantage of all of these benefits. In some mills the bottle neck is on the paper machines — in which case, of course, shorter cooking time offers no advantage. In other cases, reduction in bleach demand is not attractive to a manufacturer of pulp to be used in the unbleached state, and so on.

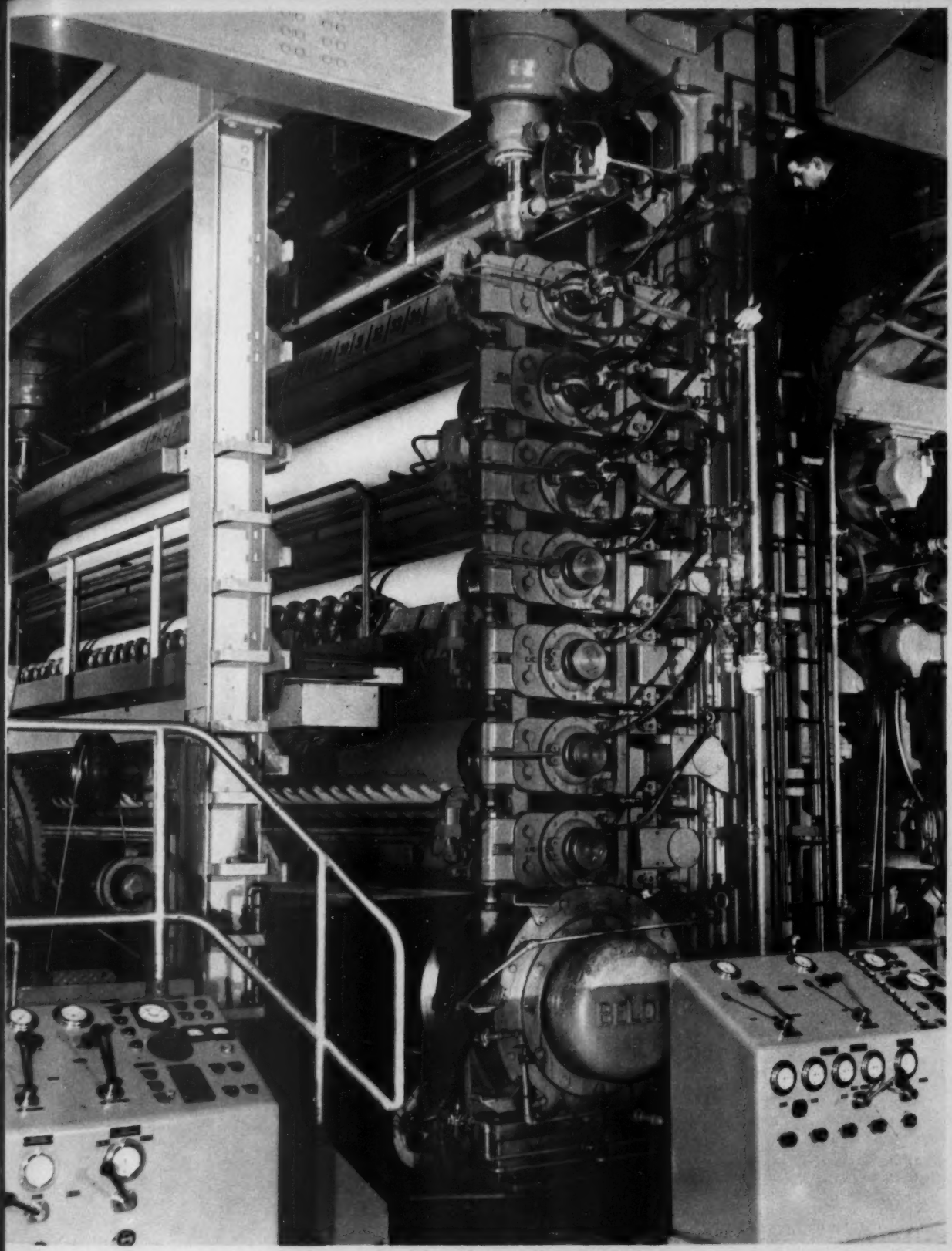
Drawbacks of ammonia base sulfite cooking

There are, of course, certain considerations on the debit side:

1. Cooking with ammonia base costs appreciably more than when calcium base liquor is used. A penalty of about $4.00 per ton of pulp appears to be realistic. This may be wholly or partially written off by increased pulp yield or greater productivity.
2. Since ammonia attacks copper alloys it is necessary to replace all copper, bronze and brass with something which is resistant—stainless steel is, in most cases, the only alternative.
3. Sulfite digesters are, almost without exception, lined with acid-proof brick set in litharge glycerine cement. The same is true of the acid accumulators or storage vessels. Experience has shown that these linings do not stand up to ammonia base acid. Thus, it is necessary for continuous operation with ammonia base to have digesters and accumulators lined with a denser brick set in furfural resin cement.

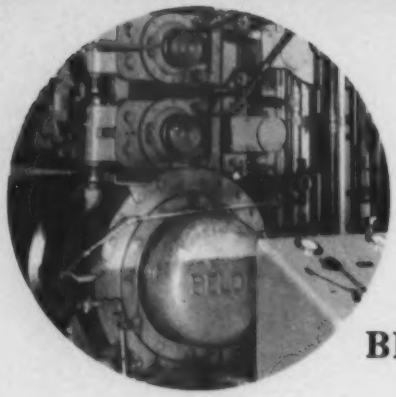
In spite of these objections, however, the advantages to be gained are considerable. My feeling is that there should be an increased demand for NH_3 by the pulp and paper industry during the next few years. One of the biggest incentives for increasing the use of ammonia in sulfite pulping would be a decrease in the price of NH_3.

*Manager of pulp pilot plants and pulp development for Industrial Cellulose Research Ltd., Hawkesbury, Ont.



BOWATERS SOUTHERN PAPER CORPORATION. PHOTO BY J. W. MILLER

Beloit Openside Calender Stack Today's wider, higher speed machines have focused increasing importance on the calender's ability to deliver a sheet of constant caliper and uniform surface finish to the reel. For further details, please turn the page.



BELOIT OPENSIDE CALENDER STACK

. . . uniform nip pressures, sheet threading at high speeds with greater safety

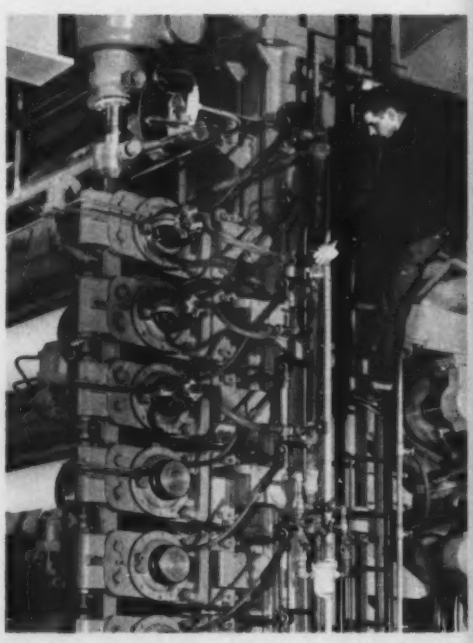
The calender stack has always been an extremely critical piece of equipment. Today's wider, higher speed machines have focused increasing importance on the calender's ability to deliver a sheet of constant caliper and uniform surface finish to the reel. Precision calendering is reflected in the clean lines of Beloit's openside design.

The Beloit openside design permits rolls to separate with a minimum of friction. This freedom of movement eliminates roll "plugging." The self-aligning spherical roller bearings are under continuous lubrication.

Beloit openside calenders employ a positive benchboard-controlled mechanical lift for changing nips or separating rolls. A further engineering advancement is the development of diaphragm air jacks* for maintaining uniform nip pressures throughout the stack for various nip combinations. This arrangement greatly facilitates sheet threading—with greater safety—at high speeds.

*patent pending

Special attention has been given to the design of the calender rolls to permit a more uniform grinding job when it becomes necessary to regrind the rolls. When running, each roll is serviced by a heavy-duty air-loaded doctor.



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Acrylic emulsions for paper coatings

F. L. SCHUCKER
Paper Chemicals Department
Rohm & Haas Co.

Part I — Properties of acrylic coatings

Acrylic resins are virtually colorless and odorless and can be produced in emulsion form having good mechanical and chemical stability.

IN RECENT YEARS much effort has been devoted to developing synthetic binders to produce improved pigmented coatings for paper and paperboard. The first synthetic binders to attain extensive use are the styrene-butadiene latices. However, these have been used principally at relatively low concentration levels in combination with natural binders, such as starch and casein, so that the properties of the binder system were largely controlled by the natural binders.

The advent of acrylic resin emulsions now makes it possible to prepare binder systems containing acrylic resin as the major constituent and to produce paper coatings having combinations of useful properties heretofore unobtainable. Acrylic resins are virtually colorless and odorless and can be produced in emulsion form having exceptional mechanical and chemical stability. The emulsions can be formulated to give coatings of low viscosity at high solids content. Being thermoplastic, acrylic coatings can be polished to a higher gloss and smoothness than can most natural binders. Also, they perform effectively the basic function of a binder — bonding pigments tightly to the paper or paperboard substrate.

The first acrylic emulsion to find wide use in pigmented paper coatings was Rhoplex AC-33, from which highly successful coatings have been produced with a Champion-type roller coater, particularly on paperboard. Although the physical quality of the coatings produced was of considerable interest, the major advantage was a marked improvement in the printing quality of the finished board. The printing quality includes excellent fine-line definition, deep true ink colors, good ink hold-out and an overall three-dimensional effect. The Rhoplex AC-33 coatings have excellent mechanical stability when subjected to the temperatures and shearing stresses of high-speed coating processes. The coatings dry rapidly, thus reducing the demands on the dryer section of the coating machine and can be calendered to a high gloss and exceptional smoothness, surface qualities that are particularly desirable in fine-line and halftone printing.

Two other acrylic emulsions were subsequently introduced for application under more varied mill and printing conditions. The first of these is Rhoplex B-60A. This emulsion has lower viscosity than Rhoplex AC-33 and greater compatibility with certain specialty clays, and it minimizes foaming on the paper coating machine. The second of the newer acrylic emulsions is Rhoplex B-15. This emulsion was developed to improve pick-resistance, especially with the high-tack inks used in letterpress printing. This emulsion was designed to eliminate the lifting of the coating with high tack inks, which occurred almost exclusively at the interface between the earlier acrylic coatings and the substrate because of inadequate adhesion between the polymer and the cellulose paper.

Rhoplex B-15 is based on a new emulsion polymer containing chemical groups that provide higher specific adhesion to cellulose than was attainable with the earlier acrylic emulsions. Its bonding strength is further enhanced because the polymer is relatively soft and can flow at the coating-to-paperboard interface during the coating operation. Rhoplex B-15 coatings offer a tack resistance — as measured on the Vandercook proof press and on the I.G.T. print tester, which is equivalent or superior to casein and alpha protein and markedly superior to conventional synthetic emulsion

Table I

	Acrylic Emulsion Characteristics		
Property	Rhoplex B-60A	Rhoplex B-15	Rhoplex AC-33
Total solids	46%	46%	46%
Weight/gal.	8.7 lb.	8.7 lb.	8.7 lb.
pH when packed	9.0 - 9.8	6.0 - 6.8	9.0 - 9.8
Emulsion type	non-ionic	non-ionic	non-ionic
Stability	Excellent to divalent ions and many solvents; excellent mechanical stability.		
Particle size	Less than 0.1 micron		
Freeze-thaw stability	limited	limited	excellent

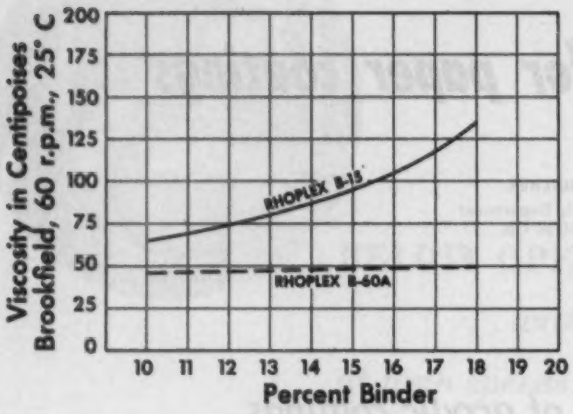

Fig. 1 (left)—Viscosity of Rhoplex coatings at different binder levels; pigment — 80 % clay, 20% TiO_2; total solids — 60%.

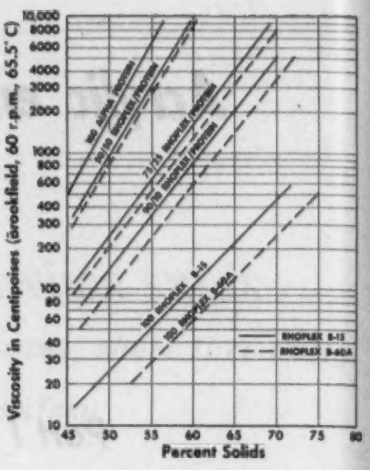

Fig. 2 (right)—Viscosity as a function of solids for Rhoplex, alpha protein and blends; pigment — 80% clay, 20% TiO_2; binder pigment — 16/100.

binders. Effectively, it eliminates the problem of printing with high-tack inks.

Specifications for the three available grades of acrylic emulsion coatings, Rhoplex AC-33, Rhoplex B-60A and Rhoplex B-15, are listed in Table I. Because of the greater versatility of the two newer acrylic emulsions the remainder of this article will concentrate on applications for Rhoplex B-60A and Rhoplex B-15.

Properties of Acrylic Coatings

High solids at low viscosity

The ability to formulate acrylic coatings having high solids content while maintaining workable viscosities permits considerable flexibility in application. Fig. 1 shows the viscosity of clay coatings containing Rhoplex B-15 or B-60A as the only binder. Fig. 2 shows the viscosity of clay coatings containing Rhoplex and alpha protein blended in various proportions. These data show that the viscosity drops substantially as the proportion of Rhoplex in the blend increases above 50 per cent. Also note that the viscosity of a predominantly acrylic binder remains manageable at solids up to 60 per cent, so that it is feasible to use high-solids formulations when needed to increase coating densities. The low viscosity of acrylic binders also enables greater flexibility in type of coating equipment that can be used, including air-knives, brush coaters, size presses, calender stacks and Champion-type coaters. Generally, 10 to 18 parts of Rhoplex per 100 parts of pigment (i.e., 10 to 18 per cent binder level) will produce a well-bound coating. The higher binder levels are normally required as the coating weight increases.

Calenderability and surface gloss

Acrylic coatings can be calendered or otherwise polished to a smooth and highly glossy surface finish as desired. The thermoplastic and mobile nature of acrylic binders, unlike typical casein coatings which are hard and brittle, permits them to flow on the paper machine. Similarly, the flow produced by the application of pressure and heat of the calender stacks enables the surface of the acrylic coating to be finished to a level of gloss and smoothness beyond that attainable with any protein system. In the Champion process the coating is applied at the dryer section, and flow occurs as the coating passes over the remaining dryers to produce a

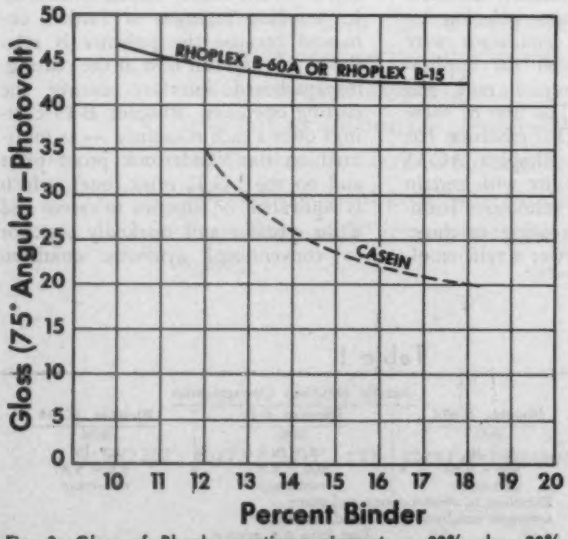

Fig. 3—Gloss of Rhoplex coatings; pigment — 80% clay, 20% TiO_2; calender pressure — 60 lb./lineal inch.

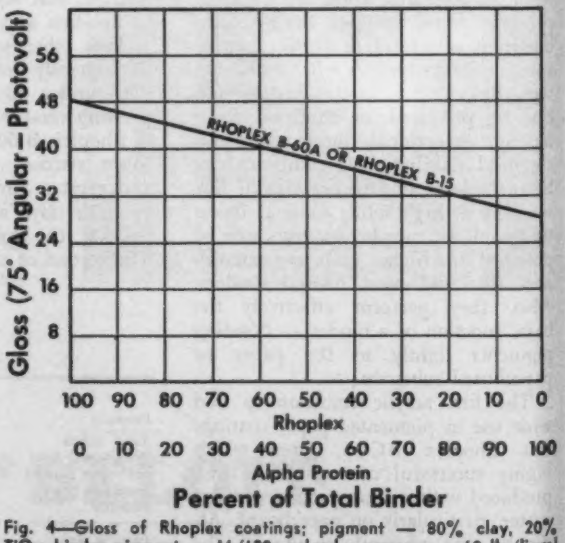

Fig. 4—Gloss of Rhoplex coatings; pigment — 80% clay, 20% TiO_2; binder pigment — 16/100; calender pressure — 60 lb./lineal inch.

smooth and glossy finish.

The ultimate level in gloss finish is obtained with a 100-per cent acrylic system, but gloss is reduced proportionately as the acrylic binder is blended with increasing amounts of protein binders. Fig. 3 illustrates the gloss obtainable with a 100-per cent acrylic binder at various binder levels as compared with casein. Fig. 4 illustrates how gloss is reduced by increasing the percentage of natural binder in an acrylic-alpha protein system. It is not recommended that the proportion of acrylic binder in the blend be reduced below 50 per cent, since the gloss and general surface appearance of the coating will then be governed by the properties of the starch or casein or protein binder.

Controlling "orange peel"

Since synthetic emulsions generally exist as discrete particles, they do not contribute the water-soluble protective colloid normally provided by a protein binder. Such a colloid is necessary to produce adequate flow and leveling of the coating during application and to prevent "orange peel" or "pattern" in the coating, which is caused by agglomeration of the clay while drying. Therefore, when an all-acrylic binder is used a protective colloid of some type should be added to prevent agglomeration of the clay. The addition of 0.3 per cent of Kelgin XL, based on pigment weight, in formulations containing Rhoplex B-15 as the sole binder will be effective in overcoming orange-peel, though some increase in viscosity will result. Where the acrylic binder is already blended with casein or starch in order to modify the flow properties of the coating, the natural binder provides this necessary protective colloid. A ratio of 75 parts acrylic and 25 parts of protein or starch will serve the purpose and minimize orange-peel appearance. As previously mentioned, the gloss attainable with a coating will be reduced as the proportion of casein, starch or protein is increased in the binder blend.

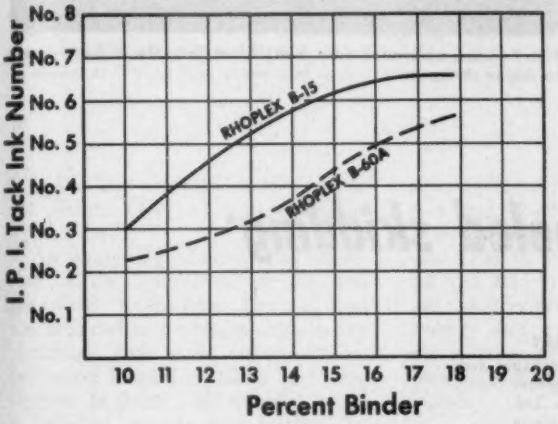

Fig. 5—Pick resistance of Rhoplex coatings (Vandercook Press), pigment — 80% clay, 20% TiO_2; total solids — 60%.

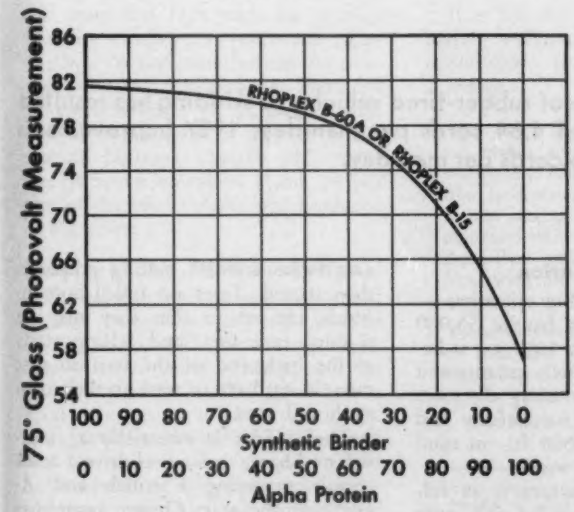

Fig. 7—Varnish hold-out (as measured by gloss) of supercalendered coatings containing Rhoplex and alpha protein; pigment — 80% clay, 20% TiO_2, binder pigment — 20%.

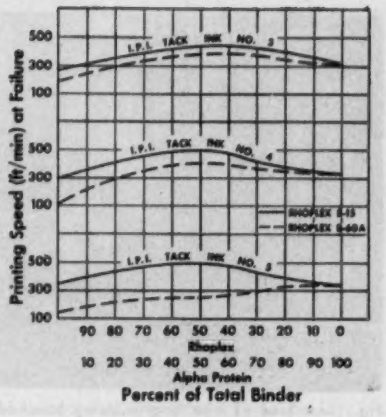

Fig. 6—Pick resistance of Rhoplex alpha protein coatings (I.G.T. instrument).

Bonding strength

Fig. 5 illustrates the bonding strength of Rhoplex B-15, in terms of pick resistance, as compared with Rhoplex B-60A. Both emulsions produce coatings superior in bonding strength to starch and, as shown in Fig. 6, Rhoplex B-15 produces bonding strength equivalent to that of alpha protein or casein. The unusual bonding strength of this binder is derived from the functional group in the polymer that are capable of specifically adhering to paper as well from the relatively softer nature of the coating. The data in Fig. 6 suggest that at certain blends, a synergistic effect exists between the acrylic emulsion and other water-soluble binders that produce greater bonding strength than is obtainable from either binder material alone.

Print quality

Acrylic coatings provide a very smooth printing surface with good ink hold-out and withstand printing

(Continued on page 542)

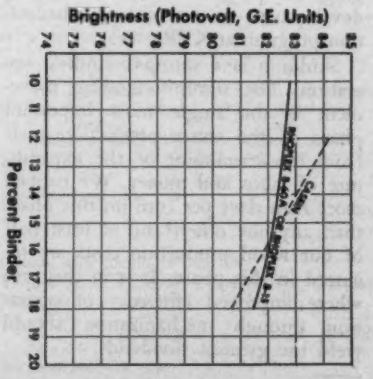
Brightness (Photovolt, G.E. Units)
74 75 76 77 78 79 80 81 82 83 84 85
Percent Binder
10 11 12 13 14 15 16 17 18 19 20
RHOPLEX B-60A OR RHOPLEX B-15
CASEIN

Fig. 8—Brightness of Rhoplex coatings, pigment — 80% clay, 20% TiO_2.

Fig. 1—A load of tree lengths being bunched by winching in.

Fig. 2—Load assembled with butts lifted into the A-frame ready to skid to slasher set.

Tree-length wheeled skidding*

D. W. GRAY
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Logging Engineer
The KVP Co. Ltd.
Espanola, Ontario

The application of rubber-tired vehicles to skidding has resulted in a production of 4.64 cords per man-day; 1957 improvements may raise this to 6 cords per man-day.

ONE OF THE NEWER developments in the mechanization of pulpwood operations in eastern Canada has been the application of rubber-tired vehicles to skidding. This "new look" in skidding is a procedure which, as applied to tree-length logging, has played a major role in the development of our own mechanization program at KVP.

Skidding is a stump-to-landing operation. The stump-to-landing movement is the single most important phase of the entire production cycle from the standpoint of the expenditure of labor and money. We expend more man days per cord on this phase than any one other, and at least half of our wood production costs are incurred in this phase. It is in this area where improved efficiency of operation through mechanization should yield the greatest dividends.

*Abridged from a paper presented at the annual conference of the Forest Products Research Society.

The skidding operation

The wheeled skidding operation — which is expected to handle 35,000 cords of pulpwood in 1957 — is being carried on under both summer and winter conditions. Skidding distances have been extended successfully and economically up to 3000 ft. in summer and 4000 ft. in winter.

The operational pattern is as follows: It is a hot-logging job with trees being delivered to a slasher as cut. The cut-and-skid crew is a four-man unit with three or sometimes four such crew units delivering wood to the one slasher. The four-man unit consists of one skidder operator, one chokerman and two fellers and limbers.

Roads suitable for truck hauling will have been prepared in advance and slasher sites or sets cleared and bulldozed. A slasher is moved in, and felling starts with the clearing of skidding trails radiating out from the slasher site to the perimeter of the area to be skidded. Felling proper is then started. Trees are felled butt towards the set so that they may be skidded butt first, and felling starts at the back end of the trail so that men do not have to work in their own slash and tops.

The skidder is essentially a short-wheel-base, all-wheel-drive truck chassis mounting a winch and A-frame at the rear. Choker assemblies consist of a ⅝-in. main line some 40 or 50 ft. in length carrying up to seven or eight chokers that slide on the main line on rings. Chokers are ½-in. cable 6 ft. in length, with a Bardon hook and ferrule attachment. Each skidding unit is supplied with two choker assemblies. As trees are cut and limbed out the load is prechoked by the chokerman. The skidder comes in, drops his empty choker assembly, hooks on to the loaded one and assembles his load by winching in and bunching all the butts into the A-frame (Figs. 1 and 2). The winch

Fig. 3—Load arriving at the slasher set will be dropped about 10 ft. ahead of the position shown and in line with slasher feed.

Fig. 4—Discharge end of the slasher showing production of 17-ft. sawlogs and 100-in. pulpwood.

is locked and the load skidded out to the slasher (Fig. 3). Loads average ¾ to 1 cord.

An interesting phase of this operation is the integration of log and pulpwood production. Our slashers are designed to enable us to slash any particular tree into either 100-in. pulpwood lengths or 16 to 18-ft. log lengths. In parctice all material which is suitable in size and quality for sawlog production is cut into logs, and only the tops and the smaller trees are produced as pulpwood (Fig. 4). We do not manufacture the sawlogs ourselves, but exchange them for an equal volume of pulpwood with one of our neighbors who is in the sawmill business. On the 1956 summer jackpine operation about 20 per cent of the total volume was produced in log form.

Results of the 1956 operation

During the summer and fall period at one camp we cut and skidded 16,500 cords, with the average skidding distance being 1100 ft. and the maximum 2400 ft. The stand was a good one on a level-to-rolling site and gravelly-to-loamy soils. Jackpine was the predominant species with a light admixture of poplar and birch and an understory of spruce and balsam. The stand was clear cut for softwoods and poplar. Trees averaged 6.1 to one cord and ran as large as 26 ins. at the stump and 90 ft. in height. Yield per acre was about 45 cords. Production per man-day (eight hours) cut and skid averaged 4.64 cords and per skidder-hour 2.33 cords. Peak daily productions were as high as eight cords per man-day and four cords per skidder-hour.

During the past winter on another operation we took out 1750 cords of three-length poplar. Ground conditions were good, terrain level, and trees averaged 7.4 pieces per cord. In this case skidding distance averaged 2100 ft., and the maximum distance was 4100 ft. Production per man-day cut and skid averaged 4.75 cords and per skidder-hour 2.54 cords. The average skid was twice as long as on the summer operation, and yet both man and machine productions were higher.

Future developments

It is felt that there are at least two major weaknesses in the described operational pattern of tree-length skidding:

1. The strict hot-logging nature of the job makes it too demanding and not sufficiently resilient. Skidding production is determined from hour to hour by the cutting production. The skidder interferes with both the chokerman and the fellers, and the feller in turn interferes with the chokerman and to some extent the skidder.
2. Portable slashers are more expensive to man and operate than would be higher capacity permanent installations.

The 1957 program calls for an improvement in the first of these conditions by breaking the hot-logging phase following the felling and limbing. Trees will be precut well in advance of the skidding, and the cutter will be independent of the rest of the cycle; choking and skidding will be able to proceed at a rate determined only by the capacity of the skidding unit and freed entirely from hour-to-hour dependence on the cutter. In this way skidding production can be expected to increase from 2.5 cords per hour to three or even four cords without reduction in skidding distance. Felling production should increase, and it seems not unreasonable to anticipate a cut-and-skid production of six cords per man day instead of 4.75.

A second test will be in the loading and hauling of tree lengths to a central point, preparatory to the possible later establishment of centralized processing plants. This again should spell increased man-day production and lower costs.

TABLE I

A. Comparative man-day requirements per 100 cords of 100-in. pulpwood loaded on truck ready to haul to final landing.

(a) Fell & Wheeled Skid Tree-length to Slasher—Slash & Load		(b) Cut & Pile—Bundle Yard & Load		(c) Fell Tree-length Cable Yard to Cold Decks Slash & Load		(d) Cut & Skid with Horses to Main Road Skidways—Crane Load	
				Fell	11	Cut & Skid	37
Cut & Skid	21	Cut & Pile	37	Yard	15	Load	2
Slash & Load	9	Yard & Load	3	Slash & Load	8		—
	—		—		—		39
Man days/100 cords	30		40		34		—
	—		—		—		

B. Approximate equipment investment cost per 100 cords daily (8 hour) delivery

Skidders	$40,000	Yarder (part)	$16,000	Yarders (3)	$ 60,000	Crane (part)	$25,000
Slasher(s)	40,000			Slashers(s)	40,000		
	$80,000		$16,000		$100,000		$25,000

C. Comparative costs on board trucks for direct labor and machine cost and including allowance for variance in cost of temporary roads required

	$8.00		$8.50		$8.75		$9.50

Boost your profits with safety

L. E. JOHNSTON*

A mill that is clean, well-planned, uncluttered, well-ventilated and well-lighted is on the road to a good safety record.

SAFETY IS ONE of those things we are inclined to ignore until we have to dig down deep in the old pants pocket and pay for the lack of it. It is the old story of not missing the water until the well runs dry. Too often the need for a safety program does not strike us until a visitor or an employee slips on a wet floor, breaks his arm or his pride and makes a beeline for the nearest law office.

This in not good, of course; lawsuits cost plenty these days — win or lose. An effective safety program for both visitors and employees is cheaper, more profitable and less bother for everyone.

Most safety programs are based on pure and simple garden variety horse sense. In fact, a walk through almost any paper mill with this simple fact in mind will suggest the beginnings of a usable program.

The starting point

The area where visitors enter and leave is a good place to start. Cracks, holes, ridges and bumps in the sidewalk or driveway may seem small in comparison to other hazards, but they constitute a positive danger to people who come and go in the course of doing business. These "booby traps" should be eliminated by all means; the cost is negligible, and the chance of accident is measurably reduced.

Entryways, too, are often veritable obstacle courses—full of racks, loose mats, rolls and supplies. Again, these are small things, but their very smallness makes correction quite easy. Coats can be moved inside; floor mats fastened down, and deliveries made to the proper department.

Once inside, visitors often find wet floors, wires stretched across aisles, tools scattered about and other signs of carelessness to plague them. None of this should be allowed in an area where visitors are normally expected. A single puddle of water can cause a person to slip and perhaps injure himself seriously; and a lawsuit quickly instigated might well result in a substantial judgement against the plant.

Employee safety

Visitors are important, but safety applies to employees too. Laws in most states reguire any employer to provide a safe place to work—one without built-in hazards and practices that are dangerous to the health and welfare of employees. Most employers also feel a moral obligation—a personal responsibility toward the people who work for them.

And the paper industry is no exception. In addition, a safe plant is apt to be a more profitable one; time lost from poor working conditions is costly and leads to an upset routine and the resulting confusion.

And for all its advantages, a safe operation isn't costly to instigate or maintain. To begin with, the simplest safety device of all is the most obvious—organization. A plant that is clean, well-planned with adequate working space, orderly and uncluttered, well ventilated and well lighted is on the road to a good safety record. Employees who can see without strain, have room to work and who aren't forced to climb over boxes, bales, carts and racks have a better-than-average chance of escaping injury.

Machine guards

Most modern paper machines are built with safety in mind. Danger points are guarded where possible, and many dangerous procedures have been eliminated by new designs. However, employees will often remove safety devices rather than work around them.

These people may save a little time, but the few seconds gained each hour are not worth the risk. Safety guards on trimmers, chippers, knife grinders, debarkers and other mechanical equipment should be left in place and used religiously.

Indicator lights to show when equipment is turned on can be classed as safety devices too and should be kept in good working order to avoid burns, injury or shock. Admittedly, burned-out indicator lamps are easy to ignore, but they are just as easy to replace.

Proper tools

Nothing like worn-out equipment to cause injuries. Dull saws and knives, worn wrenches and other old or improvised tools create definite hazards and contribute heavily to accidents. They cause slipshod work, too, and result in poor quality control and the inevitable costs that go with it. A safe operator will insist that his men have the proper tools for all jobs.

Shop equipment, too, must be kept up-to-date and in good condition. A worn hoist, for example, is dangerous to both employees and visitors who stray into the shop area. And so on.

*Instructor, University of Wisconsin, Department of Mechanical Engineering and University Extension Division.

Good working light

Employees in any business have the right to be able to see what they are asked to do. Poor lighting in work areas can result in eye strain, fatigue, substandard work, accidents and absenteeism. Good general lighting will pay handsome dividends in both safety and economy. In most communities, a call to the local electric light and power company will bring an engineer to help with this problem. His services and advice are free.

Ventilation

Fresh air is a basic human requirement, and an adequate fan system is "worth its weight in gold." Some buildings are not insulated as well as the newer ones and tend to be excessively hot during the summer months. This heat, mixed with steam and dirt, creates an uncomfortable and unhealthy atmosphere in which to work. Employees are more likely to become ill, uncomfortable and dissatisfied — resulting in carelessness, absenteeism, and high turnover—often just for the lack of a few well-placed exhaust fans.

The nearest ventilating equipment dealer will be glad to recommend the proper fan types and point out how they may be used to best advantage.

Fire protection

Fire in any paper mill is a hazard that must be guarded against at all cost. But, a supply of fire extinguishers does not constitute a complete fire safety program, although it is a good start.

Most fires result from bad smoking habits, puddles of oil on the floor, inflammable cleaning solvents, antiquated heating plants, outdated and unsafe wiring and general carelessness.

All these things can be controlled. Smoking can be prohibited in dangerous areas, containers can be provided for inflammable wastes and provisions made for their immediate disposal; non-burning cleaning solvents can be supplied, a modern heating system installed, outdated and unsafe wiring can be replaced, etc.

Fires bring destruction and danger, and a good safety program will eliminate these dangers, or at least bring them under control.

Adequate wiring

Poor wiring causes more than inconvenience; it can start disastrous fires as mentioned above, and electric shock resulting from it can cause death. The cost of adequate wiring will pay for itself many times over in safety and efficiency. Plenty of outlets with grounding plugs and heavy-duty wiring circuits will make all electrical equipment safer and easier to use.

The voltage of all outlets should be marked plainly; a 120-v motor plugged into a 240-v power outlet can be extremely dangerous to the operator, and it won't do the motor much good either.

All switches, receptacles and fixtures should be of the heavy-duty type to withstand hard wear. Any drop cords should be of No. 10 or No. 12 heavy-duty rubber-covered cord, and both ends should be insulated from direct contact with metal.

Storage

Storage bins should be sturdy and easily accessible. If an employee must literally climb a makeshift rack or set of shelves for tools or stock, he is asking the whole works to tip over on him. Carelessly stacked rolls of paper can fall easily and bruise seriously.

A well-designed storage area is money in the bank. Ready-made steel shelving is available at reasonable prices; racks and tables to hold machine accessories are readily available, and employees can be taught to keep things in proper order. Good storage practice is a definite part of a safe operation.

Big loads, little men

No one would think of lifting a paper roll with a watch chain, but we have all seen employees carrying loads that are too heavy for them. The effects of this undue physical strain on a man and the danger of loss from dropping articles are obvious, but still the practice goes on.

It can be eliminated of course by thoughtful planning and perhaps purchase of an additional cart or two. And for heavy lifting an overhead hoist or a well-placed conveyor will repay its cost in a short while in time saved alone.

And others

Loading docks should be maintained in a safe condition. Rolls and bales can topple over rounded edges, employees can be injured from splintered wood, and broken bones can result from loose and rotten flooring. Check loading areas regularly.

Flying slivers from trimmers can put out an eye in a flash. Men doing this kind of work should be required to wear safety goggles.

Conveyors can be time-savers, but if allowed to deteriorate they can become dangerous. A roll of paper flying from a conveyor could cripple a man for life if not kill him. Inspect all conveyors at least once a month and repair any defects immediately.

All in all, where danger presents itself, it should be guarded. Wherever feasible, all safety devices and procedures should be provided—and their use enforced. After all, a safety program is only as good as the authority who sees that it is carried out.

Only by continuous and watchful effort can paper manufacturers substitute safety records for accident records. And it can be done easily and economically by applying a few basic rules.

How to Accomplish More

(Continued from page 491)

changed in importance since entered on the program. Others are things that have been done or handled by others in the firm.

Naturally, this does not mean to go over the daily schedule and delete all things that cannot be referred or deferred. It might be the easy way to clear the decks, but it is not typical of top level executives.

Minor and unimportant things on a daily schedule got there for some reason. A quick review of the reasons and recent developments will indicate which items should be deleted.

For instance, a management consultant discovered that one executive was always loaded down with work. His secretary wrote more letters than any other in the office. Yet, this executive always had some odds and ends of unfinished business at the end of the day.

Analysis revealed that this executive personally answered all letters addressed to him. Even direct mail advertising with his name filled in on a form letter got an answer. When "file thirteen" was used to delete these irrelevant and unimportant letters his executive efficiency increased.

Do

Fifteen minutes spent in an analysis of the daily work schedule and the application of the Refer — Defer — Delete formula will be a quarter-hour well invested. Note that the paper mill executive's calendar will be reduced to a reasonable day's work . . . a plan that can be done in a minimum of time and with professional executive skill.

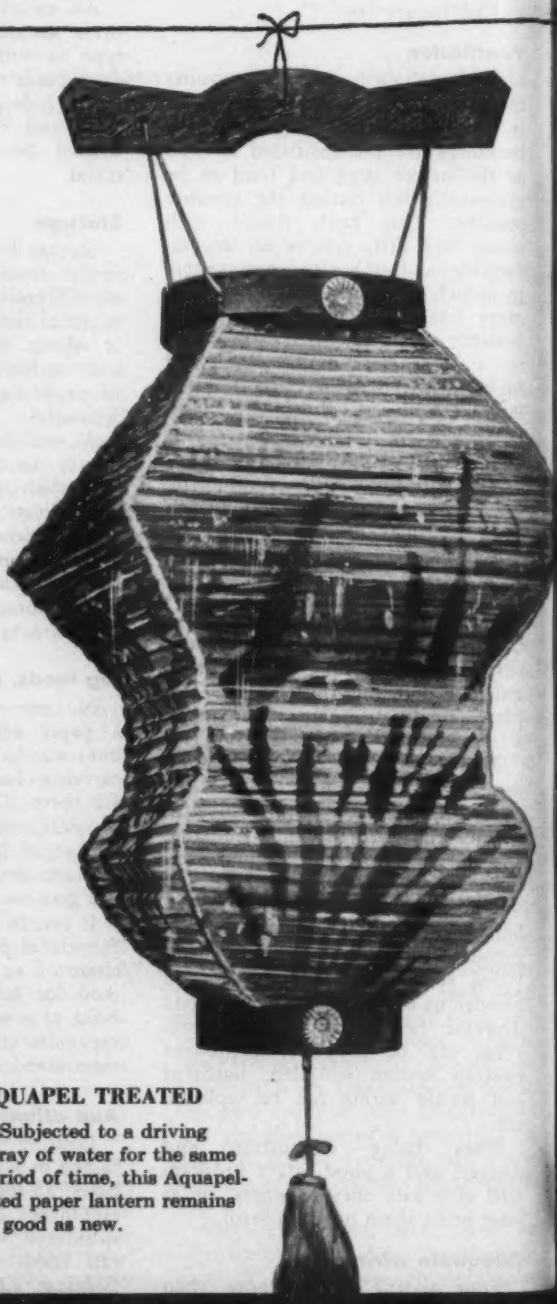
*There must be reasons for leadership**

THIS PICTURE IS W

10,000 WORDS ABOUT A

UNTREATED

—Water spray has quickly begun to disintegrate this untreated lantern.



AQUAPEL TREATED

—Subjected to a driving spray of water for the same period of time, this Aquapel-sized paper lantern remains as good as new.

HERCULES POWDE

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ISWORTH
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Maybe you don't make Oriental paper lanterns—but this actual test offers graphic proof to you of Aquapel's superior water resistance for products you do make.

This new sizing agent is finding increasing use in applications where water, acids and alkalies are encountered. Articles that were difficult or impossible to size by conventional means are now being treated successfully with Aquapel. Among the applications where Aquapel is gaining acceptance are jute liners, repellent wadding, drinking cups, milk cartons, and book paper.

More than just a surface size, Aquapel forms a chemical bond with cellulose fibers. Aquapel is economical to use and requires no special equipment. It can replace beater sizing with rosin size and alum.

Perhaps Aquapel can improve your sizing operations and help produce a better paper product. If you are interested in learning more about this different kind of sizing agent, one of our technical representatives will be glad to discuss it with you.

Paper Makers Chemical Department
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E[L] OMPANY

ORATED

SOME REASONS FOR HERCULES LEADERSHIP

UNEQUALED TECHNICAL SERVICE
A staff of more than 50 technically trained men are thoroughly grounded in the cumulative experience of 40 years' mill and laboratory service to the paper industry. Such company experience results in an understanding of the requirements of the paper industry and is reflected in the variety and dependable quality of the products designed to meet them. One of these men is always as near as your telephone.

FORWARD-LOOKING CHEMICALS
From Hercules research come new products designed to anticipate your needs for improved chemical materials. Whether it is a new grade of size based on rosin or a completely new concept, you can look to Hercules for progressive leadership.

UNMATCHED DISTRIBUTION FACILITIES
Hercules maintains by far the largest number of plants and strategically-located distribution points of any rosin size manufacturer. This is your assurance that the product you want will be delivered when and where you want it.

A SIZE FOR EVERY NEED
Hercules' large number of sizing grades means there is one available to meet practically any requirement. For unusual problems, Hercules can formulate a custom-made grade to fit your specific need. Hercules assures you the lowest possible sizing cost by recommending the right grade for your specific needs.

PACE-SETTING RESEARCH
The most extensive research and technical service facilities devoted exclusively to papermaking are maintained by Hercules. The Hercules laboratories are always at the disposal of customers in helping to solve sizing and other papermaking problems.

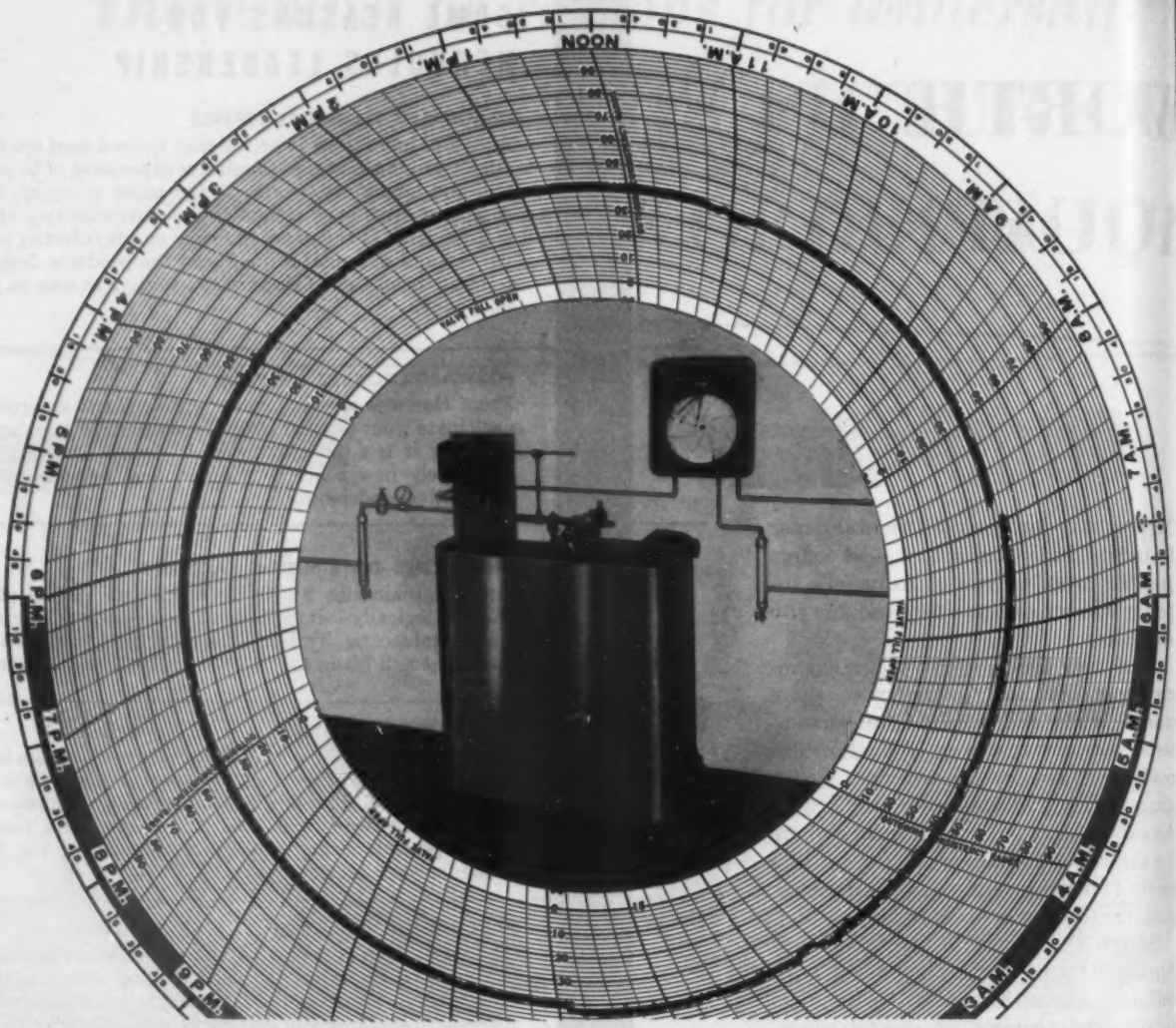
HERCULES HELPS MILL OPERATIONS
Hercules has assisted in the industry's progress by designing mechanical improvements and testing equipment. The development and extensive use of the Hercules Automatic Emulsifier, for example, has resulted in major economies in the handling of rosin size.

VARIETY OF PRODUCTS
Hercules is also a leading source of other high-quality papermaking chemicals. Wax emulsions, wet strength resins, defoamers—to name but a few made by Hercules—incorporate the same degree of skilled processing improvements that are found in Hercules'® rosin sizes.

DEPENDABLE SOURCE OF SUPPLY
Hercules' many facilities for producing rosin and rosin size assure you of a thoroughly dependable source of supply.

SAVINGS IN SHIPPING
Hercules has pioneered many improvements in rosin size distribution. The freight and handling savings made possible through the introduction of dry size and higher solids paste size, both in tank truck and tank car shipments, are typical examples.

**Hercules is the acknowledged leader in rosin*



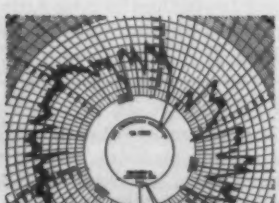
STRICT CONTROL OF STOCK CONSISTENCY

The Chart record above shows how closely the Bird Consistency Regulator maintains the exact consistency desired. The pen record shows a variation of not more than 0.1%.

The Bird Regulator is readily installed at any point in the pulp or papermaking process where consistency control is desired. The chart record and control adjustment may be located wherever most convenient for the operator.

Every installation is individually engineered for specific conditions of tonnage and consistency.

Ask for recommendations, layouts and estimates.



Section of 24-hour chart record showing variations in *incoming* consistency — before the Bird Regulator takes over.

BIRD
MACHINE COMPANY

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REGIONAL OFFICES: EVANSTON, ILLINOIS
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Canadian Manufacturers of Bird Machinery
CANADIAN INGERSOLL-RAND COMPANY, Limited, Montreal

The BIRD CONSISTENCY REGULATOR

CURRENT COMMENTS

An economic wall . . . Latin American development . . . and miscellany

by WARREN B. BULLOCK

A world movement by foreign countries to erect an economic wall against American products is growing in strength and area. Just as central European countries have begun the development of a free trade customs union, a Scandinavian duplicate is being formed to cover Sweden, Norway, Denmark and Finland. As in the case of the central European union, the Scandinavian group will abolish duties between the participating countries, with specific plans for protection of those countries against a "third party", actually the United States.

The Central European Union, however, is having its difficulties. France, in addition to putting into effect a 15-per cent reduction on United States goods, is for the time being withdrawing from the central European organization. France with its financial difficulties is tightening its belt in many respects.

The Scandinavian organization, to be known as Hamar—from its formation at Hamar, Norway—proposes to cut all customs duties between the participants by 80 per cent at an early date, with complete free trade in 10 years. The Hamar conference also considered a plan for a Nordic Investment Bank to direct investments within the members of the conference, to finance power plants and inter-Scandinavian highways and bridges, and to develop mineral resources, etc. The Scandinavian group hopes eventually to work out a plan of cooperation with the Organization for European Economic Development, thus making up an all-Europe bloc to compete with the United States.

Ineffective protection

Meanwhile, a similar proposal has been made in Latin America but is far from fruition. And all of these developments are being accompanied by continued United States administrative efforts to reduce its own tariff rates to encourage trade with the rest of the world. The domestic paper industry has filed an official approval of the latest administration program for modification of the Anti-Dumping Act. The Anti-Dumping Act, on the statute books for 30 years, has been almost wholly ineffective in protecting American industry.

For political effect?

The program of the new Canadian government will bear watching. Complaints are being voiced against United States participation in Canadian development without sufficient Canadian control of American operations. Also, the new government is talking of the danger of too heavy imports from the United States. How much of this is for political effect and how much is really planned to foster Canadian development and control of investments will not be known until formal proposals are brought before Parliament.

United States paper and board manufacturers, however, are not abandoning efforts to expand this country's export trade. The Kraft Export Association of the United States, organized in 1952 for joint promotion of exports, has changed its name to the Pulp, Paper and Paperboard Export Association of the United States. Under the Webb-Pomerence Act domestic companies are enabled to form export associations without coming under the anti-trust laws.

500,000 idle acres

Development of paper mills in Latin America is going forward apace. Mills in many countries are being financed in part by United States capital, the present objective being to produce paper for home consumption and for export. A report by an agent of the Pulp & Paper Advisory Group to Latin America, a United Nations activity, is urging the investment of $200,000,000 in Chile for the use of pine wood from 500,000 idle acres of timberland. Such a project is said to mean a new source of foreign exchange for Chile of $80,000,000 a year. Container Corp. of America and W. R. Grace & Co. are planning paper mills in Colombia to be finished late in 1959 and provide 70,000 tons of paper annually. The mills are expected to make Colombia self-sufficient in the production of all grades of paper and paperboard except newsprint. Container Corp. is subscribing $1,700,000 as 80 per cent of the cost of a mill to produce writing, printing and other papers. The Grace mill will use bagasse as its raw material.

Odds and ends

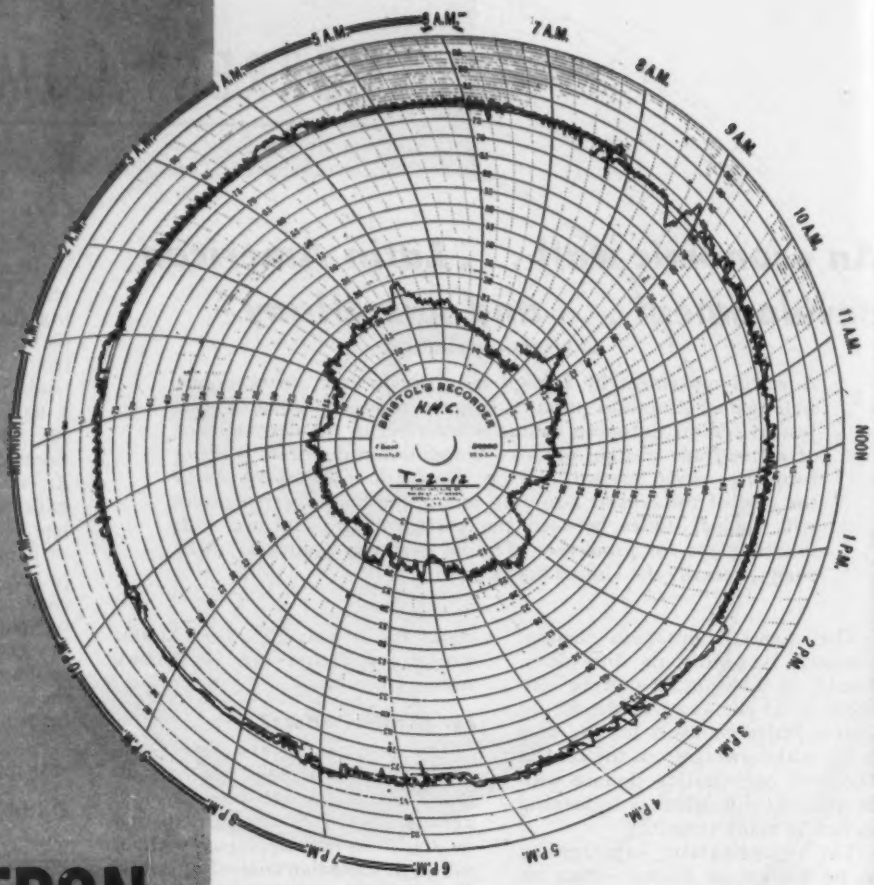
A United States company which financed a mill in South Africa to produce hardboard is under United States investigation for the reported importation of this product into the United States at dumping prices. The company is understood to take the position that its action was necessary for its own protection against low-priced Scandinavian products. The company's original complaint under the Anti-Dumping Act has thus back fired. The government is making a similar inquiry into the prices at which hardboard from Canada is being sold in this market.

The newsprint supply situation is having some unexpected repercussions. The *New York World-Telegram and Sun* has announced a reduction in its general and retail advertising rates. The reason is a drop in circulation, which followed its increase of the price of its week-day edition from 5 cents to 10 cents per copy. Other New York newspapers that advanced their subscription price have as yet made no announcement of advertising rate changes.

A minor news item of the month announces that Champion Paper & Fibre Co. has during the past year added 45,000 acres of pulpwood land to its forest holdings, which now total 584,000 acres with cutting

Your Charts Will Look Like This With The

HURLETRON AUTOMATIC MOISTURE CONTROL



Reproduced above is a typical daily chart made in a major paper mill using the HURLETRON Automatic Moisture Control. Since the installation of the HURLETRON, this mill's daily production has increased by more than one-half percent, and a better quality and more uniform product is being made without any increase in the tonnage of stock required. The chart above is typical of the experience you can have in your own plant with this completely new automatic system of moisture control. The new HURLETRON measures, indicates, records and controls moisture with savings in stock and production costs that will make it self-liquidating within four months for all types of paper and board. You can enjoy increased production, improved quality and lowered costs with the HURLETRON Automatic Moisture Control. Write or telephone for further information.

HURLETRON Electric Eye Equipment Company

1930 EAST FAIRCHILD STREET, DANVILLE, ILLINOIS

Current Comments . . .

rights on 250,000 acres of land owned by other interests.

International Paper Co. has been enjoined by the Federal Trade Commission to desist from acquiring interest in any competitive companies for the next 10 years. The order clarifies the picture as to International's acquisition of the Long-Bell Lumber Co. with its vast timberland holdings. The federal commission has directed International to take the following steps:

1. Sell all its recently acquired stock in Longview Fiber Co., Longview, Wash.

2. Sell at least 40 per cent of the production of the paper and paperboard mill it proposes to build in Oregon to independent non-integrated wholesalers, converters and other purchasers in 11 western states.

3. Sell the 12 per cent stock interest formerly held by Long-Bell in Longview Fiber.

This compromise of the Federal Trade Commission's effort to block International's purchase of Long-Bell is declared by John H. Hinman, chairman of the board of International, to be satisfactory.

Financial Reports

Paper mill securities suffered losses in Wall Street during July as part of the general downward movement. Bears and bulls were trading in narrow limits, waiting to determine whether the latter part of the year will have an upward or a falling trend.

Net Incomes

Albemarle Paper Mfg. Co.—For 12 weeks ended June 12, $475,041; a year ago, $634,186.

American Box Board Co.—For six months ended May 31, $932,225; a year ago, $1,175,954.

Brown Co.—For the first half, $1,055,154; a year ago, $1,107,133.

Celotex Corp.—Net income for the six months ended April 30, $1,595,647; for the same period a year ago, $2,695,598.

Champion Paper & Fibre Co.—For fiscal year to March 31, $14,285,000; for the preceding fiscal year, something over $13,000,000.

Chesapeake Corp. of Virginia—For the first half, $1,711,972; a year ago, $1,926,066.

Container Corp. of America—For the June quarter, $4,043,000; a year. ago, $5,043,000.

Crown Zellerbach Corp.—For six months ended June 30, $18,776,000; a year ago, $24,973,000.

Eastern Corp.—For six months, $625,740; a year ago, $824,465.

Fort Wayne Corrugated Paper Co.—For the quarter ended June 15, $327,955; a year ago, $355,462.

P. H. Glatfelter Co.—For the first half, $1,038,514; a year ago, $1,203,742.

Great Northern Paper Co.—For 24 weeks through June 16, $32,200,553; a year ago, $30,329,321.

KVP Co.—For the June quarter, $795,122; a year ago, $957,548.

Keyes Fibre Co.—For six months, $769,025; a year ago, $707,083.

Kimberly-Clark Corp.—For the year ended April 30, $24,820,590; previous fiscal year, $24,120,001.

MacAndrews & Forbes Co.—For six months, $447,674; a year ago, $401,163.

Marathon Corp.—Net income for the year ended April 30, $8,428,132; for the previous fiscal year, $8,835,633.

Masonite Corp.—Cumulative net income for the first three quarters, $3,297,337; for the previous fiscal year's same period, $5,387,410.

St. Regis Paper Co.—For first half, $9,895,543; a year ago, $13,465,391.

Scott Paper Co.—For first half, $10,782,968; a year ago, $11,411,753.

Sorg Paper Co.—For six months ended June 30, $260,401; a year ago, $458,496.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Aug. 9, 1957	July 10, 1957
Celotex	32¼	30¾
Same Pref.	*17-17½	*17¾
Certain-Teed	8¾	9¼
Champion P & F	36⅜	37½
Same Pref.	*89¾-90	*90
Chesapeake Corp.	25⅝	26
Crown Zellerbach	52⅜	57⅞
Same Pref.	*86-89	*88-91
Eastern Corp.	24⅜	26¾
Federal Paper Board	34⅝	33¾
Same Pref.	*18½-18¾	*18⅞-19¼
Fibre Paperboard	29	28
Same Pref.	*101-102	*105¼-106
Great Northern	70	77
Hammermill	32	34¾
International	102	108½
Same Pref.	*82-85	*86¾-90
Kimberly-Clark	48¾	48½
MacAndrews & Forbes	*28-28½	28
Marathon	27⅝	28
Masonite	30	34
Mead Corp.	34⅝	39
Same Pref.	*85¾-86	89
Minnesota & Ontario	27⅜	31
Oxford Paper	34¼	37¾
Same Pref.	*90-91½	*90½-91½
Rayonier Inc.	22⅞	26⅛
Riegel	27¾	28¼
St. Regis	32	34
Same Pref.	*88-91	88
Scott Paper	59½	61½
Same $3.40 Pref.	*75-78	*82-85
Same $4 Pref.	*87-90	*93-95
Sealright	27½	27⅜
Sutherland Paper	36⅛	35¼
Union Bag-Camp	32⅛	35¼
United B & C	22½	26½
United Wall Paper	8⅛	8½
Same Pref.	*17¼-18¼	*16-17½
U. S. Gypsum	59	63⅛
Same Pref.	149	*153-158
West Va. P. & P.	40	44¾
Same Pref.	*97⅛-100	100

New York Stock Exchange — Bonds

A. P. W. Products 5%	—	81
Champion P & F Co. 3¾%	—	—
Champion P & F Co. 3%	—	—
Mead Corp. 3%	—	—
Scott Paper 3%	93¾	86

American Stock Exchange — Stocks

Allied Paper	12⅜	13½
American Writing	21	22
Brown Co.	17⅛	18¼
Puget Sound	15⅛	15

*Closing Bid and Asked Prices.

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Extraction Systems

Reduce Costs
•
Increase Production
•
More Uniform Sheet
•

Here's how: —

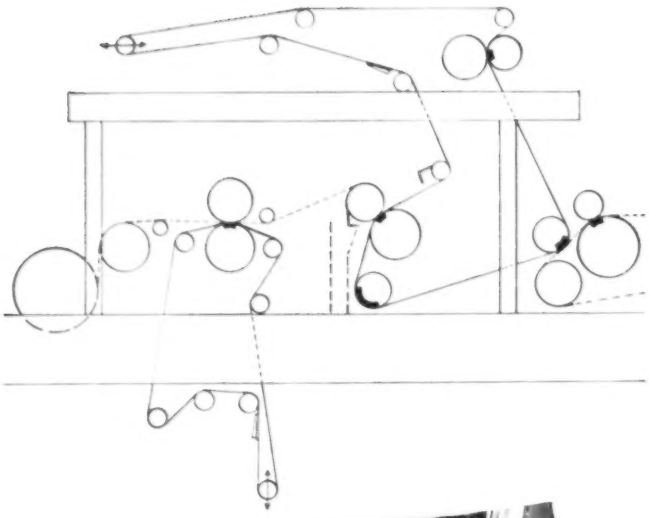
- Operates on all grades from 10# to 270# kraft liner boards.
- Makes possible working more water into sheet.
- Low operating vacuum promotes longer wire and suction box cover life.
- Minimizes possibility of wire locking and chattering.
- Saves up to 50% of flat suction box power requirement.
- Natural vacuum provides higher retention.
- Automatically provides correct vacuum at all suction boxes.
- Assures correct moisture content of sheet at the dandy.

These are just a few of the reasons why a Poirier Baromatic Syphon System is so popular. It will help you too.

Write for full information today.

POIRIER CONTROL COMPANY
Waterville 9, Maine

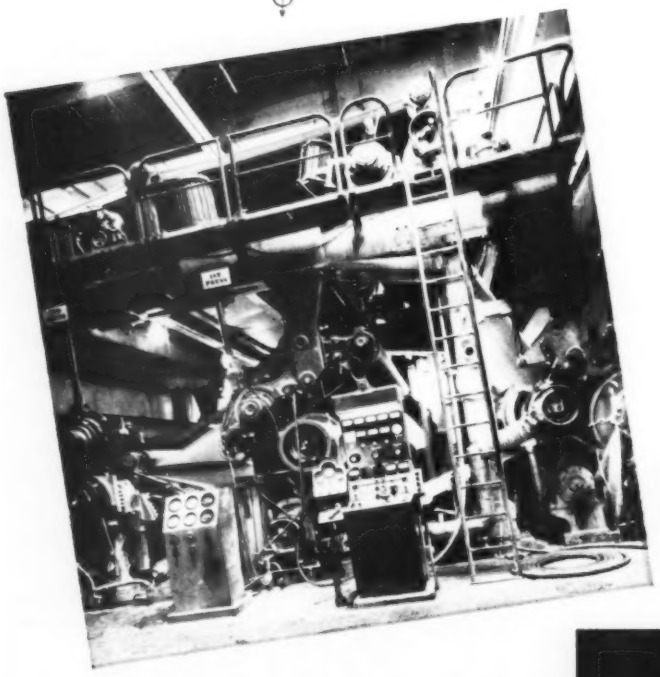
Specialists in Stock Control Equipment



Fraser adds
Vacuum Pick-Up. Gets

MORE PRODUCTION, FASTER SPEEDS

with Puseyjones Machine



Production increases of 15% to 20%! Speeds approaching 1600 f.p.m.! These are the profit-building benefits now being achieved by Fraser Paper, Ltd., with a new Vacuum Pick-Up installed on their most recent Puseyjones Machine.

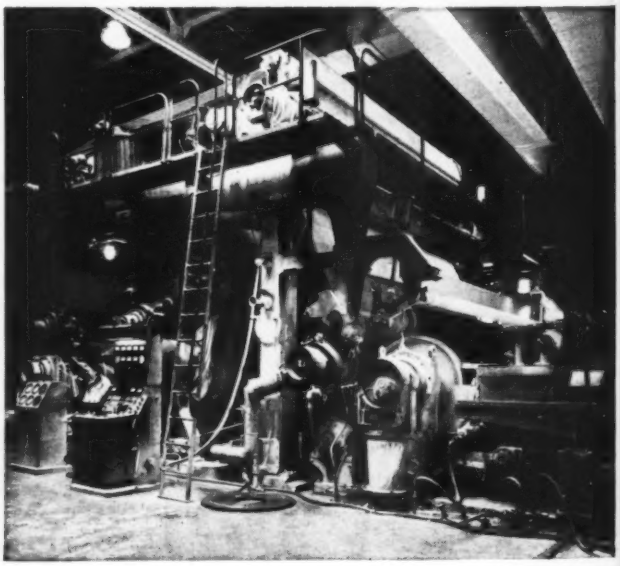
What's more, production and speeds are so satisfactory that Vacuum Pick-Ups will soon be installed by Puseyjones on Fraser's No. 1 Bond and No. 5 Catalog Machines.

Does your production need a "pick-up"? Then talk it over with Puseyjones Engineers. Call or write us today.

THE PUSEY AND JONES CORPORATION
Established 1848 : : Builders of Paper-Making Machinery
Fabricators & Welders of all classes of Steel and Alloy Products
Wilmington 99, Delaware, U.S.A.

SIMPLIFIED PICK-UP ARRANGEMENT

Built in late 1954, this 196" Puseyjones Fourdrinier replaced a 26-year-old Machine, also by Puseyjones. As the No. 4 Machine at Fraser Paper, Ltd., Madawaska, Maine, it was designed and constructed to operate at speeds up to 2,000 f.p.m., and space was provided for later addition of a Puseyjones Vacuum Pick-Up, as shown above. Machine manufactures waxing papers and similar grades.



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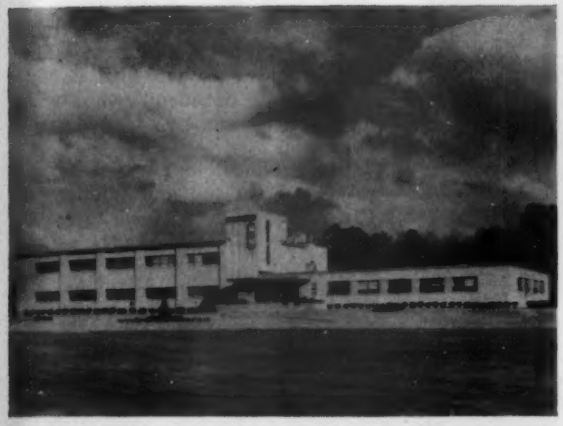
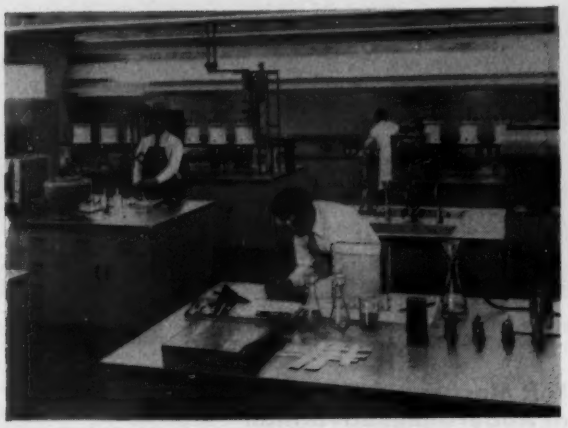
NEWS of the INDUSTRY



HEADQUARTERS OF Rayonier's new Eastern Research Div., where 76 scientists and other personnel work toward the conversion of chemical cellulose into new and improved end products.



CELLULOSE SOLUTIONS laboratory has a wide variety of equipment for the preparation and evaluation of viscose and other cellulose derivatives. The research station is at Whippany, N. J.

Broader Uses of Cellulose Aim of New Rayonier Lab

RAYONIER INC. has unveiled its third and newest research center. Located in Whippany, N.J., the laboratory brings the forest products industries into the atomic age.

Rayonier is pioneering the injection of trees with radioactive isotopes. Its scientists are also subjecting non-cellulosic as well as cellulosic fibers to brutal strength tests. And they are creating new ways to produce superior fibers and film based on cellulose.

According to Dr. R.L. Mitchell, manager of the multimillion-dollar research station, Rayonier scientists are believed to be the first to expose trees to controlled studies based on radioactivity and to "shoot" them with radioactive material.

At the time of the lab's dedication a Rayonier staff scientist—using only an ordinary hypodermic syringe—injected a dosage of radioactive carbon 14 into the trunk of a small pine growing nearby. The injection will tag this year's annual growth ring for use in subsequent research.

Traced to the End Product

The use of radioactive material promises still better ways to explore wood growth factors, nutrient uptake and soil conditions.

Pine needles from species on Rayonier's southeastern forest holdings are being studied, along with soil samples.

And at some future date that little Whippany pine injected with radioactive carbon will be felled, debarked, ground into small chips and used for the production of chemical cellulose. The radioactive tracers, still present after numerous mechanical and chemical production steps, will help researchers follow cellulose characteristics and behavior right on through to any end product capable of being reproduced in the laboratory.

Thus, Rayonier sees the possibility of even further improvements in some of its more than 500 products made from chemical cellulose. Among them are rayon, cellophane, tire cord, sausage casings, photo film and paper, lacquers, many plastics and acetate.

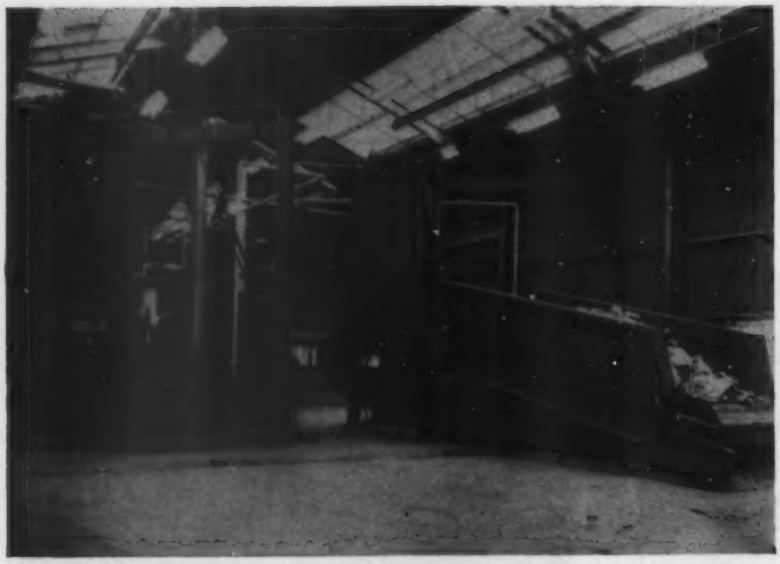
R. M. Fowler Points Up Mounting Costs

"Recent announcements of freight rate increases only serve to emphasize the mounting cost problems of the Canadian pulp and paper industry."

In a recent report to the membership, R. M. Fowler, president of the Canadian Pulp & Paper Association, said, "As usual, the increase of about 7 per cent by U. S. railways will . . . be followed by Canadian carriers. . . . Canadian manufacturers can recognize and must accept the causes for these increases, for they are based on rising labor and material costs such as they themselves have experienced.

"During the first half of this year the marketing of Canadian pulp and paper has continued at high levels. Total newsprint shipments were slightly higher than in 1956. Chemical pulp shipments in the first six months were only about 2 per cent less than in the previous year of peak demand. Production of book and writing papers was slightly higher this year than last; paperboard 1957 production was down about 3 per cent from the previous year, and wrapping papers are running 8 per cent below the first half of 1956. In all branches of the industry increased capacity has eliminated shortages and delays in delivery."

This relatively small amount of



HYDRAPULPER manufactured by Black-Clawson is an integral part of the stock preparation system at the Savannah mill of Ruberoid Co.

Felt Machine in Operation at Ruberoid in Savannah

A Black-Clawson Co. single-cylinder machine for the production of roofing felt and kindred grades is in production at the newly integrated Savannah, Ga. plant of Ruberoid Co.

Designed to produce three-width roofing felt in weights ranging from 25 to 75 lb. per 480 sq. ft., the new machine was winding saleable paper at the reel in a record 40 min.

Formerly a saturating and converting plant, the Savannah operation is now producing the felt grades needed for its own converting operations.

The machine is designed to trim 120 in. and operate at speeds of up to 300 fpm. It utilizes a single 48-in. counterflow-overflow vat and two main presses at the wet end. Presses are air-loaded, and the rolls are constructed for 300-lb. nip pressure. The first press is arranged for straight-through operation, while the second is reversed.

Fifty-one 48-in. diam. dryers arranged in double-deck fashion are mounted on high-type frames, thus eliminating the need for a dryer pit.

A four-roll calender, a Black-Clawson Autoflyte 36 reel with transfer rails to unwind stands and a mill winder comprise the finishing end.

The entire machine is driven through short-centered V-belt drives for close draw control.

Furnish is comprised principally of wood fiber, mixed waste paper, corrugated, sorted rags and wood flour.

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idle or excess capacity would not be serious and might even be desirable were it not for the mounting pressures of rising costs on profit margins, Fowler continued. These pressures have been reflected in published financial reports for the first half of the year. One company after another without exception has announced a substantial drop in profits. In the first half of 1957 the average decline in net profits has been about 20 per cent.

"For companies producing newsprint and pulps, which enter heavily into export trade, the financial problem has been greatly intensified by the abnormally high premium on the Canadian dollar." Fowler explained that, "This premium has now increased to record levels above 5 per cent in relation to the United States dollar. In the first six months of 1956 the discount on the U. S. dollar averaged about half of 1 per cent. As a result . . . the loss on exchange suffered by Canadian newsprint mills has been nearly $15,000,000, or nearly $6 per ton in terms of Canadian dollars. (On August 27 the Canadian dollar was worth 105.03 U. S. cents.)

"The distortions and difficulties caused by the abnormal and artificially high value of the Canadian dollar on Canada's major exporting industries," Fowler concluded, "has become an urgent and pressing problem."

$40,000,000 Pulp Mill Proposed in Nova Scotia

The provincial government of Nova Scotia has recently signed a 50-year agreement with Nova Scotia Pulp Ltd. calling for the building of a proposed $40,000,000 pulp mill. Construction must start not later than June 1959.

Nova Scotia Pulp is closely associated with Stora Kopparbergs of Sweden. Among company officers so far designated for the recently organized Nova Scotian firm is Karl A. Clauson, president, who heads the Swedish company's United States operations.

The proposed mill would be one of the largest and most modern in Canada, with capacity in excess of 300 daily tons of high-grade bleached pulp.

The location of the plant has not been determined, but speculation favors the Strait of Canso area. Nova Scotia Pulp under a forest management plan has been granted rights to cut timber on the mainland and on Cape Breton.

New Group Considers Alberta Pulp Mill

A $40,000,000 pulp mill has been proposed for the White Court area of central Alberta. It follows closely the completion of the $35,000,000 mill of North Western Pulp & Power Ltd. at Hinton. (North Western is owned jointly by St. Regis Paper Co. and North Canadian Oils Ltd.)

The new firm that has proposed the White Court mill is West Forest Products Corp. and is headed by two Edmonton men who were formerly involved in the Hinton project.

Various plans for mills in Alberta have been advanced during the past 10 years, but the Hinton plant is the only one that has materialized.

The proposed White Court operation would be in a belt heavily timbered by spruce, jackpine, popple and other woods suitable for pulping. Extensive surveys will be undertaken in the 5000-sq. mile region under consideration.

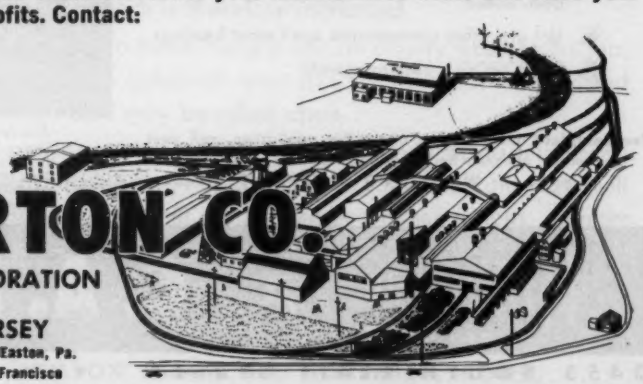
Wisconsin Leads in Paper Production

Wisconsin leads all other states in the production of paper and paperboard. This according to the latest available figures from the United States Bureau of the Census.

For 1955 Wisconsin accounted for 6.4 per cent of the national out-

TISCO® PULP WOOD CHAIN

Ceaseless wear, heavy impact, excessive dirt, and severe strain — these four production killers work against pulp wood chain without let-up. That's why smart mill operators choose the chain which is longer-wearing and impact-resistant under all conditions. Find out how tough TISCO manganese steel pulp wood chain can lower your maintenance costs and raise your profits. Contact:



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DIVISION OF HARSCO CORPORATION

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SALES OFFICES: New York — Chicago — San Francisco

ST. REGIS PAPER CO.'s three-year tests proved Norgren MICRO-FOG best for lubricating the bearings on these paper machine dryer sections.

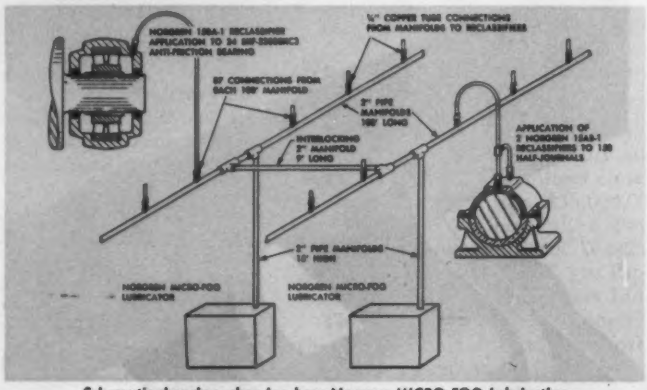
174 BEARINGS ON PAPER MACHINE DRYER SECTIONS LUBRICATED BY NORGREN MICRO-FOG

...Result of 3 Years of testing by St. Regis Paper Co.

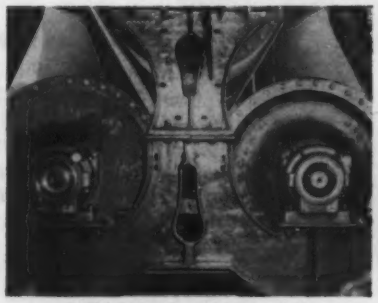
The block grease lubrication system for the 174 bearings on the dryer sections of this machine was inadequate, requiring supplementary hand lubrication, and was costly to maintain. Three years of extensive tests by St. Regis, comparing Norgren MICRO-FOG with other methods of lubrication, proved to them that MICRO-FOG is best. By changing to MICRO-FOG Lubrication, St. Regis gained the following advantages:

1. MICRO-FOG Lubrication is by far the most thorough.
2. Maintenance of lubrication system is easier.
3. Bearing temperatures have been reduced.
4. Less lubricant is consumed.
5. Paper losses due to excessive lubrication have been ended.
6. Lint and other contaminants can't enter bearings.
7. MICRO-FOG is easy to operate.

For complete information about this application, call your nearby Norgren Representative listed in your telephone directory—or **WRITE FOR BLUEPRINT MF-23.**


NORGREN 1BA-1 RECLASSIFIED APPLICATION TO 24 SKF-2308BRHC3 ANTI-FRICTION BEARING
¼" COPPER TUBE CONNECTIONS FROM MANIFOLDS TO RECLASSIFIEDS
87 CONNECTIONS FROM EACH 100' MANIFOLD
2" PIPE MANIFOLDS 100' LONG
INTERLOCKING 2" MANIFOLD 5' LONG
APPLICATION OF 2 NORGREN 1BA8-1 RECLASSIFIEDS TO 120 HALF-JOURNALS
2" PIPE MANIFOLDS 10' HIGH
NORGREN MICRO-FOG LUBRICATOR
NORGREN MICRO-FOG LUBRICATOR

Schematic drawing, showing how Norgren MICRO-FOG Lubrication is conveyed to the bearings.



Anti-friction bearing at right shows how one MICRO-FOG distribution line serves each bearing. Note oil leakage at bearing at left where old lubrication system was used during test.

MICRO-FOG enters each plain bearing through two lubrication lines, providing a continuous protective coating of fresh lubricant over the entire surface of the bearing.

MICRO-FOG by NORGREN

C. A. NORGREN CO.

3455 SOUTH ELATI STREET • • • ENGLEWOOD, COLORADO

put, with 1,939,357 tons of paper and paperboard. This figure puts the Badger State ahead of New York, Louisiana and Florida.

Ontonagon Mill Nears Completion in U. P.

Huss Ontonagon Pulp & Paper Co.'s new plant at Ontonagon in Michigan's upper peninsula is scheduled to go into production by the first of the year. (The recently organized firm is owned by Huss Lumber Co. of Chicago.)

Huss Ontonagon originally acquired the unused kraft linerboard plant of National Container Corp. and has since added a new structure and equipment installations at a cost of some $3,000,000.

National Container (now a division of Owens-Illinois Glass Co.) abandoned the linerboard mill with the depletion of softwoods in the region. Huss-Ontonagon, however, will apply new pulping techniques and thus take advantage of the some 24,000,000 cords of hardwoods in the area.

The neutral sulfite semichemical process will be employed. Species to be used include birch, basswood, maple, elm and beech.

Major among the new equipment that is being installed is a 176-in. Pusey & Jones Corp. fourdrinier paper machine.

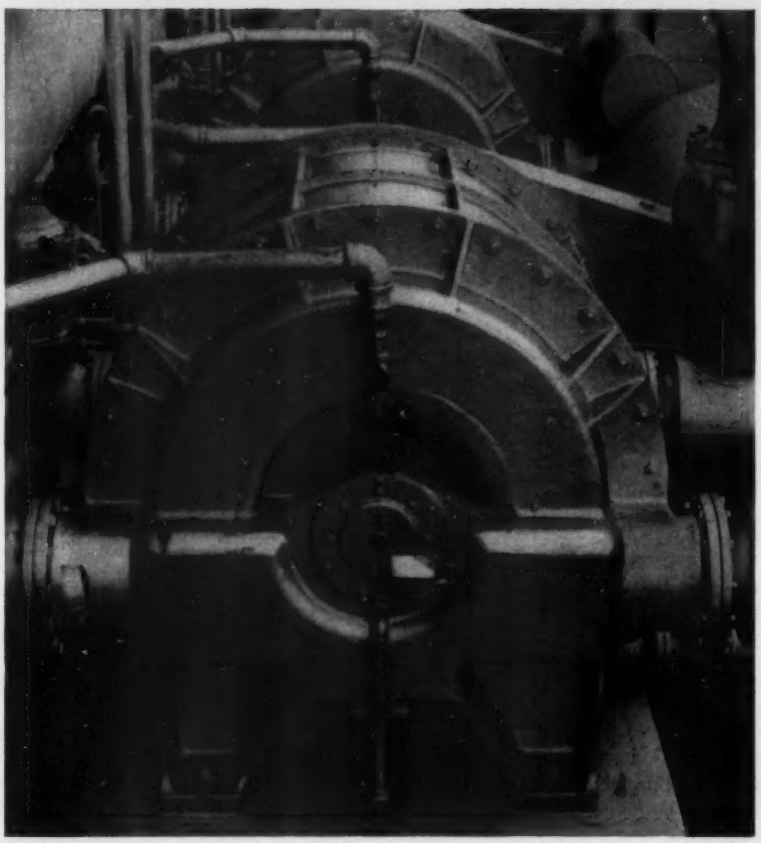
Major Expansion Set by Nekoosa-Edwards

Nekoosa-Edwards Paper Co. has announced a major expansion move —its first outside its home state. The Port Edwards, Wis. firm recently purchased Racquette River Paper Corp.'s pulp and papermaking facilities in Potsdam, N.Y. Racquette River is a division of Orchard Paper Co. of St. Louis, a leading converter of paper and paperboard specialty materials.

Nekoosa-Edwards acquired all the pulp-, paper- and power-producing properties, while Racquette River continues to operate the Potsdam converting facilities.

The Wisconsin company announced that on completion of the purchase it would immediately put into effect an expansion and modernization program at Potsdam. Included would be a pulp bleaching

High machine speeds? High temperature headbox stock? You need NASH Vacuum Pumps!



Air from the suction rolls on paper machines carries with it substantial quantities of moisture. This considerably reduces the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump, because of the unique principle of operation, the bulk of this vapor is effectively condensed inside the pump. The total capacity of a Nash is therefore increased.

When you specify a Nash Pump it can be closely sized to the job. It is not necessary to select an over-sized unit, because the rated capacity of the Nash may be relied upon.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

NASH ENGINEERING COMPANY

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News of the Industry . . .

plant, a process water treatment plant, the transfer of a paper machine from the Nekoosa (Wis.) mill to Potsdam and the modification of the machines now in operation at Racquette River.

Named resident manager of the Potsdam mill was Burt Kassing, manager of production planning for Nekoosa-Edwards since March 1955. He joined the firm in 1950 as director of process and product development.

Allied Plans Entry into Converting

Allied Paper Corp., with headquarters in Chicago, has taken options to purchase three firms in the converting field. The acquisitions, according to a company spokesman, "will be a step in the expansion program intended to broaden the major producer into an integrated firm".

Involved in the proposed action are Osborn Paper Co. Inc. and Mid West Paper & Envelope Co. Inc., both of Marion, Ind., and the Sharon Div. of Osborn (formerly Sharon Converting Co.) of Sunnyvale, Cal.

Osborn Paper, a manufacturer of paper school supplies since 1892, and Mid West Paper & Envelope, a producer of envelopes and social stationery since 1918, are affiliated but have separate corporate organizations.

J. & J. Rogers Drops Colorado Plans

J. & J. Rogers Co. of AuSable Forks, N. Y., has abandoned plans to construct a pulp and paper mill near Silt in western Colorado. The plant was to have cost approximately $7,000,000.

The firm notified the United States Forest Service that it is unable to demonstrate its ability to construct the mill. A preliminary contract for 3,000,000 cords of beetle-killed spruce has been canceled.

Under terms of the original agreement, the mill was to be in operation by the end of 1957. J. & J. Rogers had been granted three extensions. July 31 was the deadline, at which time the company was to have submitted a construction schedule.

Fire-Bombing Operation Held in New Brunswick

An aerial forest fire-bombing operation was to be held in Charlo, N. B., August 12 and 13. Sodium calcium borate was the chemical with which the experiment was made.

The test was made during the fire protection conference held under the auspices of the Woodlands Section of the Canadian Pulp & Paper Association.

Great hopes have been held out for sodium calcium borate in combatting forest fires. It has been hoped that it will effectively retard spreading flames. Suspended in water, the chemical when released from an aircraft will fireproof trees in areas adjoining the fire.

Johns-Manville to Install 50-in. Machine at Natchez

Equipment at the new Johns-Manville hardboard plant in Natchez, Miss., will include a single-width 50-in. Black-Clawson Co.

ENGLISH ECCO CLAYS TRADE MARK **CLAYS**

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

A TOTAL OF $24,900 in scholarships was awarded at the recent meeting of the scholarship committee of the Pulp & Paper Foundation Inc. at North Carolina State College's School of Forestry. Committee members pictured here with school officials are (front row, l to r): Elmer Leavitt, general manager, North Carolina Pulp Co., Plymouth, N. C.; Ramsey Buchanan, retired public relations manager, the Mead Corp., Sylva, N. C.; Edward Loughlin, chief chemist, Southern Kraft Div. of International Paper Co., Georgetown, S. C., and Dr. Harold Charbonnier, manager of the Pulp & Paper Div., Union Bag-Camp Paper Corp., Savannah, Ga. In the rear are: Robert G. Hitchings, assistant professor of pulp and paper technology, North Carolina State; Prof. C. E. Libby, head of the pulp and paper technology curriculum; Arthur Aranow, director of public relations for Riegel Paper Corp., Acme, N. C., and Dean R. J. Preston of the School of Forestry.

hardboard machine. The mill is scheduled for operation late this year.

The machine is designed to produce approximately 60,000,000 sq. ft. of hardboard annually.

The unit will utilize a stainless steel headbox and will have a fourdrinier-forming table for sheet with sewed wires on top and bottom. It will feature a bottom-forming wire to travel from the breast roll through the table roll and Rotabelt section, entering the press section and returning after passing the last press. The press section will consist of three pair of plain presses equipped with patented stops having micrometer adjustments that will prevent the press rolls from contacting each other when stock is not being run. Wire damage is thus prevented.

1956 Forest Fires at Record Low

The number of forest fires over the nation during 1956 hit a record low. According to the United States Department of Agriculture, the achievement was realized in spite of the fact that the American people visited and used forest lands more than ever before.

A total of 143,485 fires was reported on private, state and federal lands—a reduction of 1695 from the 1955 figure. Despite this favorable showing, a blaze was reported on an average of every 3½ min.

Improvements noted in the 1956 fire protection picture included progress in fire prevention in the South, fewer man-caused fires and a reduction in the number of intentionally set blazes.

Man-caused fires dropped 5 per cent, due largely to organized prevention campaigns conducted by federal and state agencies, industries, private organizations and individuals.

Improved equipment and firefighting methods reduced the area burned by 1,462,707 acres, down to 6,605,894 acres in 1956. Contributing to this decrease was the fact that organized forest fire protection was extended to an additional 3,148,000 acres, bringing the 1956 total to 607,032,000 acres under protection.

Still topping the list of man-caused fires are incendiarists, debris-burners and smokers.

(Turn to page 516)

NOW—CHECK ACCURACY WHILE YOU CHECK MOISTURE!

New Electronic Moisture Registers have first "built-in standard" in a 3-second, portable moisture tester.

NOW DIAL ACCURACY IS ASSURED, even under the extremes of production-line use. With *self-checking standard*, Moisture Register's new Model 5's are checked and adjusted for calibration accuracy right on the job—by any untrained operator. He simply fits electrode to standard. Then with new trimmer he sets dial for perfect alignment. Gives calibration adjustment *in the field.* You get practical accuracy down to 0% ... 3-second spot tests for moisture wherever your product may be. Portable, light weight, battery operated, new rugged construction with miniature tube. Factory-set to your needs.

For faster testing of—

- Kraft, all paper and board stocks
- Gypsum and insulating materials
- Cellophane, many plastics

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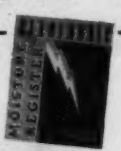

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P. O. Box 910, Alhambra, California
Please send data on new Model 5's.

We are testing _____

in moisture range from _____% to _____%

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Recent Expansions in the Industry

Consolidated Paper Corp. Ltd.
has cut back operations at its Port Alfred, Que. newsprint mill by eight hours per week. According to a company spokesman, increasing production capacity at other Consolidated mills—along with a surplus of newsprint—is responsible for the reduction.

Pollock Container Corp.'s
$2,000,000 plant for the production of paper boxes at Garland, Texas, was to be ready for operation September 15. The 115,000-sq. ft. facility is of concrete lift-slab construction and will house an 85-in. Langston corrugator. Boxes will be produced with A, B and C flutes and in single-, double- and triple-wall thicknesses. Monthly capacity will be 60,000,000 sq. ft. of corrugated boxes. (Pollock Container is a subsidiary of Pollock Paper Corp.)

West Virginia Pulp & Paper Co.
plans to begin the production of grocery bags in an operation adjacent to its Charleston, S. C. mill. Equipment has been ordered, and production is scheduled to begin the first of the year. Paper will be supplied by the recently completed $20,000,000 kraft paper machine at the Charleston mill that is expected to be in operation in several months.

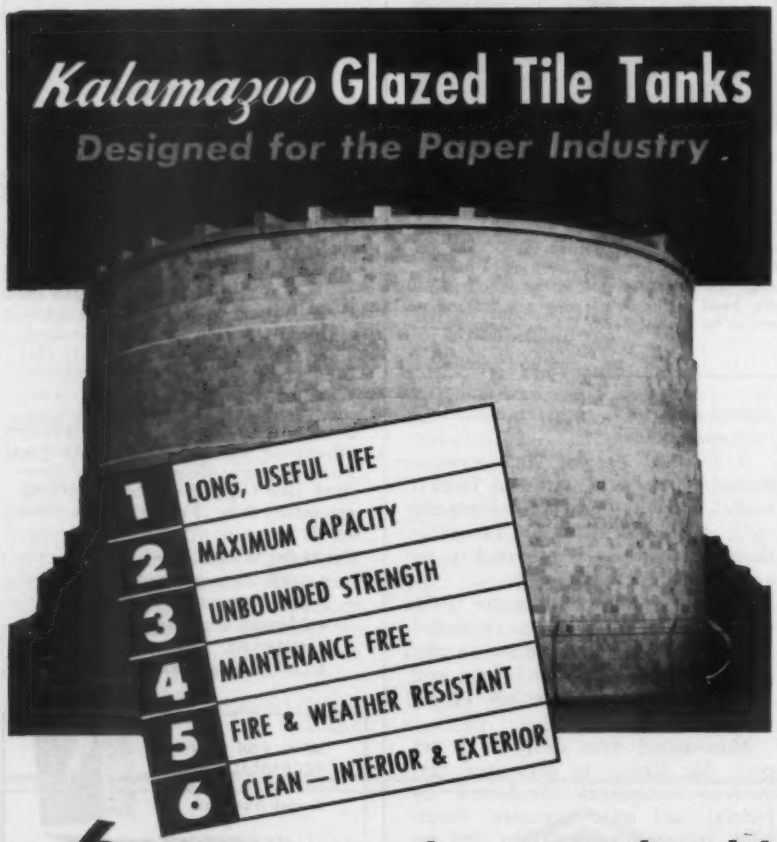
MacMillan & Bloedel Ltd.
has entered the converting field with the production of grocery bags at its new Paper Converting Div. plant on the North Arm of the Fraser River in Vancouver, B. C. The self-opening "square" bags cover a range of 35 sizes and weights. Six automatic machines have a rated capacity of 200,000,000 average-size bags per year. An adhesives section is being added to the plant to manufacture starch, pastes and glues.

Kimberly-Clark Corp.
of Neenah, Wis., has joined with two European firms to establish a creped wadding plant in Western Germany. The continental firms involved are Unilever N. V. of Rotterdam, Holland, and Aschaffenburger-Zellstoffwerke A. G. of Aschaffenburger, Germany.

Scott Paper Co.
has purchased an additional 73,000 shares of British Columbia Forest Products Ltd. under an agreement to purchase 1,000,000 shares at $15 by December 31. The transaction leaves a balance of 365,000 shares to be taken up.

Allied Paper Corp.
has announced that its subsidiary, Phillips Control Corp., has entered the sub-miniature electrical relay field by purchasing the assets and business of Deltronic Corp. Subminiature relays are used in military production. (Deltronic was a subsidiary of Signal Oil & Gas Co.)

The Mead Corp.
of Dayton, Ohio, has unified its box manufacturing and marketing operations and at the same time announced name changes for two subsidiaries. Jackson Box Co. of Cincinnati becomes Mead Containers Inc., while Atlanta Paper Co. of Atlanta, Ga., is now known as Mead-Atlanta Paper Co. A national sales office for Mead Containers and Mead-Atlanta



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Kalamazoo's steel reinforced glazed tile tanks are designed and erected by experts. If you have a specialized building problem it will pay you early dividends to call us now.

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The BALANCED Impeller may be trimmed to suit other heads and capacities -- yet REQUIRES NO SEPARATE COUNTERBALANCE.

- UNSURPASSED FOR HANDLING LONG STRINGY SOLIDS
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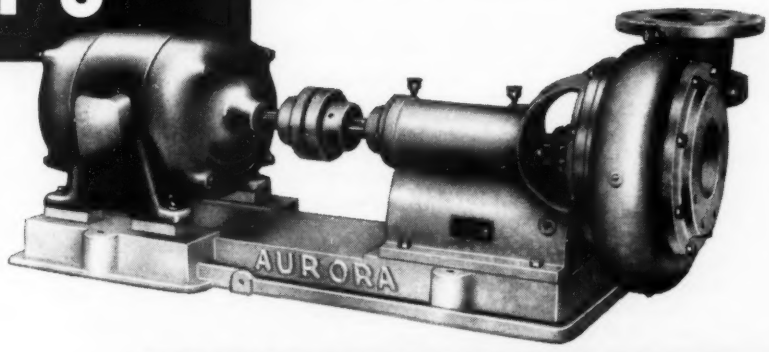
The exclusive new Mono-Vane impeller represents a major advance in the technique of non-clog pumping. This unique impeller can be trimmed to various diameters—REQUIRES NO COUNTERBALANCE because it is in dynamic and hydraulic balance — and affords a wide range of operation by merely trimming the impeller for each head and capacity requirement.



WRITE
for
BULLETIN 121 MV

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THE NEW YORK AIR BRAKE COMPANY
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EXPORT DEPARTMENT — Aurora, Illinois — Cable Address "NYABINT"

has been established at 230 Park Ave., New York, N.Y.

Owens-Illinois Glass Co.
has awarded a contract for the modernization of its Jacksonville, Fla. pulp and paperboard mill (formerly National Container Corp.) to Merritt-Chapman & Scott Corp. The program will cost more than $2,000,000 and will include the installation of an experimental unit for the continuous cooking of wood chips and the extension and modernization of a paper machine.

Wyomissing Glazed Paper Co.
and its wholly owned subsidiaries, Reading Glazed Paper Corp. and United Mfg. Corp., have been merged with Narrow Fabric Co. All the firms are located in Reading, Pa. Operations of the merged paper companies will be conducted as the Wyomissing Paper Products Div. of Narrow Fabric. The latter firm manufactures braids and elastic lace.

Union Bag-Camp Paper Corp.
has under construction at Savannah, Ga., one of the largest electric power-producing units in the paper industry. The boiler will be capable of delivering an hourly 450,000 lb. steam and will burn bark and natural gas or bark and fuel oil.

E. B. Eddy Co.
at Hull. Que., has let the contract for the structure to house its new No. 4 paper machine, and work was scheduled to begin early in July. The entire project, centered on the installation of a Beloit Iron Works Yankee unit for the production of light grades, will cost approximately $6,000,000. Completion is set for the fall of 1958.

Philip Morris Inc.
stockholders have approved a plan whereby that firm will acquire Milprint Inc. of Milwaukee, Wis., one of the nation's leading flexible packaging producers. The offer of an exchange of stock was to be made late in June and will not become effective until at least 90 per cent of the Milprint capital shares are acquired by Philip Morris.

Lord Baltimore Press Inc.
of Baltimore, Md., has purchased a 12½-acre site in Clinton, Iowa, for the construction of a folding box and label plant. The 80,000-sq. ft. operation will feature air conditioning and humidity control, multi-color lithographic equipment and letter press facilities. Finishing facilities will include a die room, cutting and creasing presses, waxer, gluing machines and label-cutting equipment. Maximum material handling efficiency will be achieved through a "continuous flow" plant layout.

News of the Industry . . .

Correction

The Bermico Pipe Div. of Brown Co. will produce electric conduit pipe from cellulose impregnated with coal tar pitch at a proposed 20,000-sq. ft. plant in Los Angeles. It was erroneously stated in the July issue that the conduit would be manufactured from "tar-covered paper products".

Papelera Pulpa-Cuba S. A.
will install E. D. Jones & Sons Co. refining equipment at its mill now under construction for the production of papers from various combinations of bagasse and long-fiber pulps.

Tasman Pulp & Paper Co.
will install a second newsprint machine at its mill in Kawerau, N. Z., at a cost of approximately $5,500,000. The unit will boost the plant's annual capacity to 150,000 tons.

Allied News . . .

Litchcote Corp., New York, N. Y. manufacturer of chemical coatings, has more than doubled its work and storage space in the Chicago area by leasing a large roundhouse from the Chicago & North Western Railroad.

Link-Belt Co. has broken ground in Indianapolis for its $5,000,000 bearing plant. Full production of anti-friction bearings is expected in 1959.

Morden Machines Co. has announced that Millspaugh Ltd. of Sheffield, England, has been licensed to build and sell the Morden Slush-Maker in Europe and the British Commonwealth (exclusive of Canada).

S. Morgan Smith Co. has moved all valve operations from its R-S plant in Philadelphia to the main plant in York, Pa. The move was made to increase productive capacity and to lower costs and shorten the delivery time.

Joseph T. Ryerson & Son Inc., warehousing subsidiary of Inland Steel Co., has opened its new steel service plant in Indianapolis. The facility represents an investment of more than $1,000,000.

Fisher Governor Co. of Marshalltown, Iowa, has agreed to exchange its common stock for the assets of Continental Equipment Co. of Coraopolis, Pa. The agreement is subject to the approval of Continental stockholders. The Pennsylvania firm is a leading manufacturer of butterfly control valves.

Tidland Machine Co. of Camas, Wash., was to consolidate its operations in a new 19,820-sq. ft. building about September 1.

Reliance Electric & Engineering Co. of Cleveland has consolidated its operations with those of Master Electric Co. of Dayton, Ohio. The latter firm will operate as the Master Electric Div. of Reliance.

Coming Events

Tappi

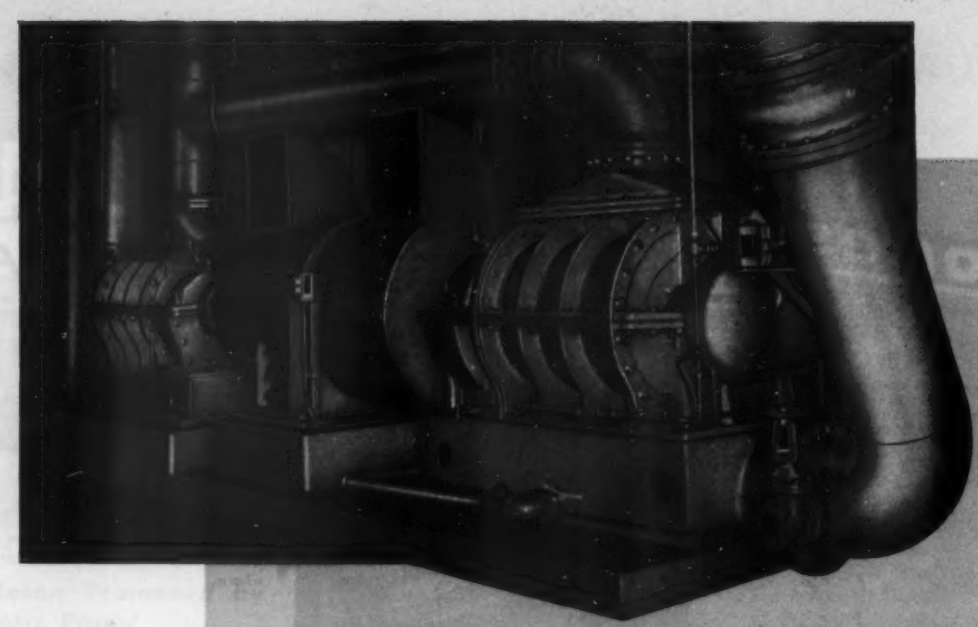
Sept. 23-26—Twelfth Engineering Conference, Netherlands-Hilton Hotel, Cincinnati
Sept. 25—Pacific Section, Tacoma, Wash.
Oct. 3-4—Second Deinking Conference, Hotel Niagara, Niagara Falls, N. Y.
Oct. 4-5—New England Section (joint meeting with Connecticut Valley Superintendents), Curtis Hotel, Lenox, Mass.
Oct. 7-8—Twelfth Paper-Plastics Conference, Sheraton-Gibson Hotel, Cincinnati
Oct. 23-24—Seventh Corrugated Containers Conference, Benjamin Franklin Hotel, Philadelphia
Nov. 6-8—Alkaline Pulping Conference, Francis Marion Hotel, Charleston, S. C.

Superintendents Association

Oct. 4-5—Connecticut Valley Div. (joint meeting with New England Tappi), Curtis Hotel, Lenox, Mass.
Oct. 16-18—Southern and Southeastern Divs. (joint fall meeting), George Washington Hotel, Jacksonville, Fla.
Oct. 18-19—Pennsylvania-New Jersey-Delaware Div. (fall meeting), Pocono Manor, Pocono, Pa.

Other Meetings

Oct. 21-25—45th Annual National Safety Congress and Exposition, Chicago
Oct. 28-30—Packaging Institute, Annual Forum, Statler Hotel, New York, N. Y.
Oct. 28-31—Society of Industrial Packaging and Materials Handling Engineers, National Industrial Packaging and Handling Exposition of 1957, Atlantic City, N.J.



For the world's largest Yankee tissue machine...

R-C Vacuum Pumps keep production rolling at 3000 fpm

R-C Positive Displacement Vacuum Pumps purchased for this installation

- Two 16 x 40 single-stage pumps
- One 14 x 35 single-stage pump
- Two 20 x 30 x 20 x 16 two-stage pumps

The 14 x 35 single-stage unit is direct-connected to a special shaft extension from one stage of a 16 x 40 unit, to make a two-stage compound pump.

At Crown Zellerbach Corporation's St. Helens mill in Oregon, the world's largest Yankee tissue machine, with a 258-inch wire, is producing 100 to 120 tons per day at a speed of 3000 fpm.

To provide the required vacuum for the pressure roll, suction wire boxes, wringer roll, suction couch, pickup and felt conditioners, there are seven Roots-Connersville vacuum pumps to supply approximately 33,000 cfm of air at 10 to 20" Hg vacuum.

Five important operating factors have proved the performance of these R-C Positive Displacement Vacuum Pumps:

- ***Reduced horsepower at higher speeds*** **(600 rpm and up) creates power savings up to 25% and far lower first cost of motors.**
- ***Single-stage or two-stage units*** **in capacities for all requirements.**
- ***Proved reliability and low maintenance*** **with no internal contacts or excessive wear and freedom from down-time and maintenance.**
- ***Minimum sealing water*** **from 4 to 40 gpm, unaffected by water temperature.**
- ***Small floor space*** **with less expensive foundations and lower cost per cubic foot of capacity.**

For evidence of how other leading industrial users benefit from these advantages, write for Bulletin 50-B-13.

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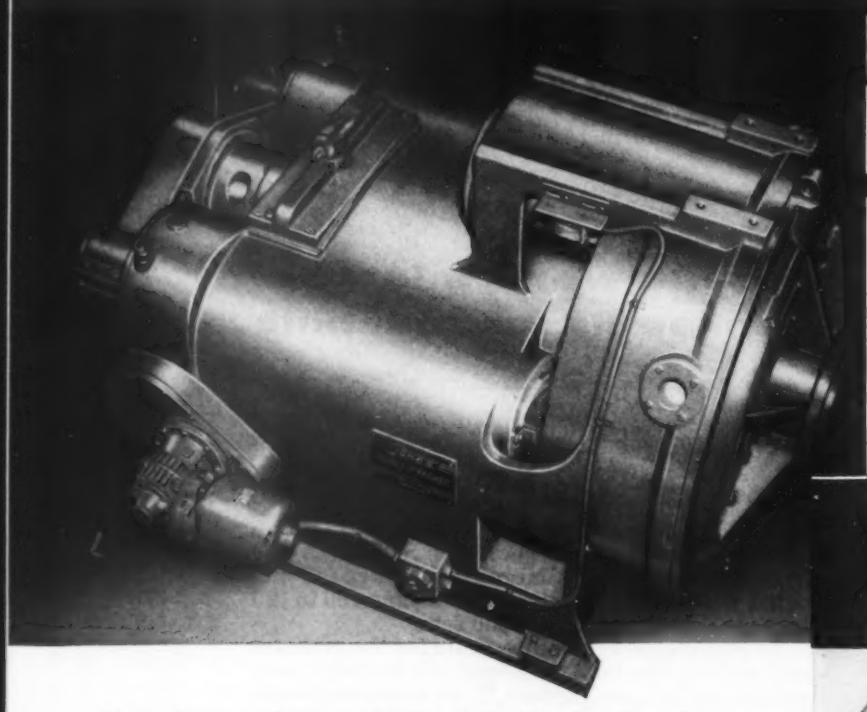
E.D. Jones DOUBLE-D WITH DOUBLE EQUA-FLO EFFECT



The clean, sturdy compactness of the Double-D requires a minimum of floor-space: it can be located almost anywhere.

Four 42" Double-D's in line serve the big new Kraft machine at International Paper's Mobile, Ala., plant. Note simplicity of piping — no special fluming or flow-boxes needed.

Not only does the amazing Jones Double-D refiner do twice the work of conventional refiners — not only does it provide two stages of refining in one pass through the machine — not only can it, if need be, defiber in the first stage and thoroughly refine in the second — but mills where it has been tried and proved for over two years report that it produces stock of equal or better quality than similar machines, even on hard-to-work stock.

Fully-pressurized, economical of floor-space, horsepower and maintenance, the Double-D is very clean in its dealing with stock; and will give any degree of refining from hydration to severe cutting. Has many other advantages. Ask your Jones representatives, or write today for Bulletin EDJ 1083.

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E.D. Jones

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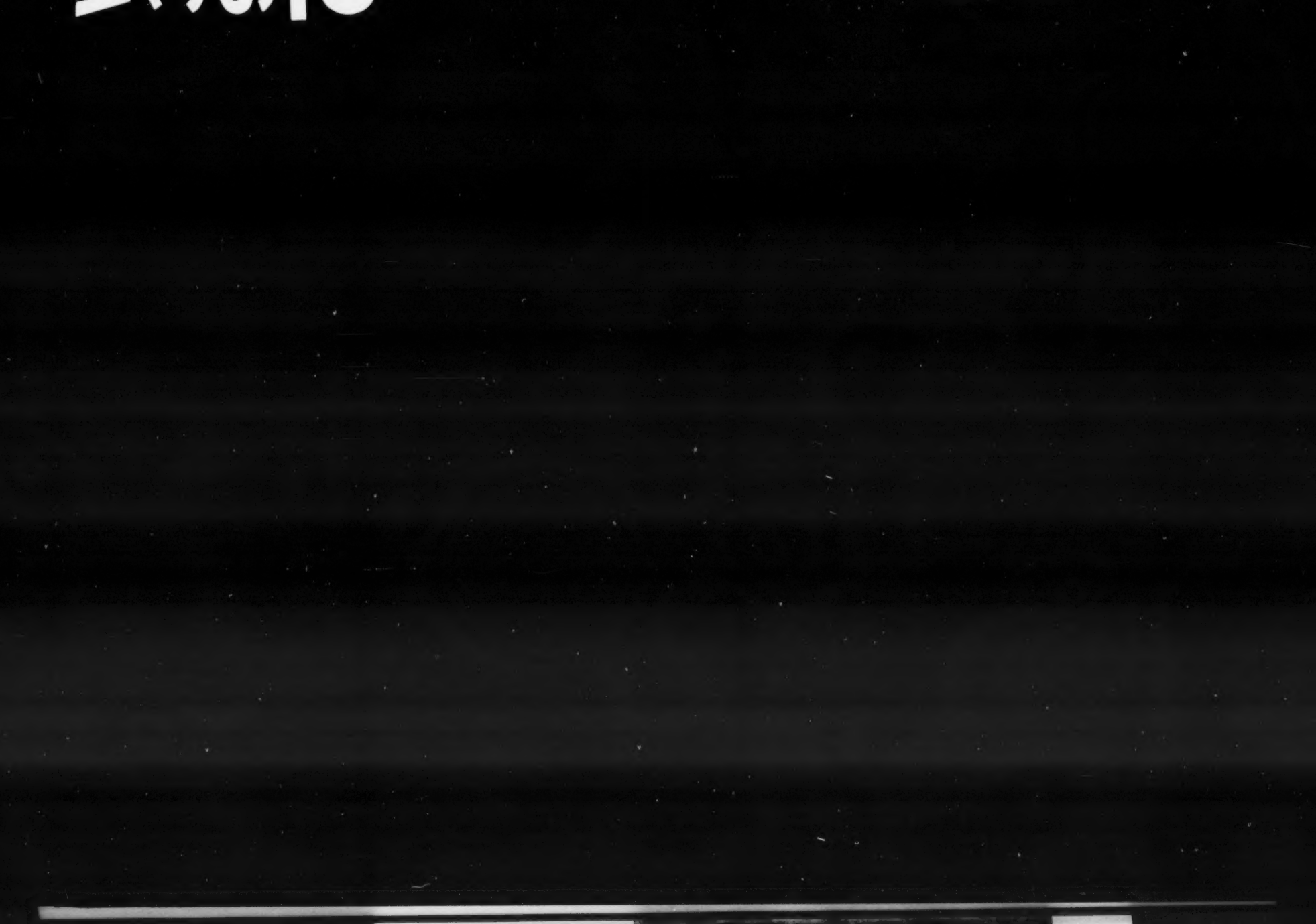


NAMES *in the* NEWS

Donald Appleton

P. L. Hovey

Appleton Promoted by Oxford Paper

Donald Appleton has been elected a member of the board of directors and a member of the executive committee of Oxford Paper Co. At the same time, he was named vice president of the company and a director of Nashwaak Pulp & Paper Co. Ltd., a wholly owned Oxford subsidiary.

Oxford also announced the election of Philip L. Hovey as vice president for manufacturing to succeed Appleton.

Appleton joined the firm in 1937 as assistant mill manager at West Carrollton, Ohio. He later became mill manager and in 1949 was made vice president for manufacturing. He will continue to serve as chairman of the firm's long-range planning committee and will be responsible for Oxford's manufacturing and development program.

Hovey became associated with Oxford in 1939 and was named to the sales department in 1941. He was later transferred to manufacturing and became manager of Oxford Miami Paper Co. in 1949. He was made staff production manager in 1952 and in 1956 was moved to the position of assistant vice president for manufacturing.

Owens-Illinois Advances Mill Division Men

Frederick B. Schelhorn has been elected manufacturing vice president for the Mill Div. of Owens-Illinois Glass Co.

Dr. Schelhorn had been mill coordinator for the division since October, when National Container Corp. was merged into the company. He was at one time manager of the Jacksonville, Fla. plant of National Container and later served as a vice president of that company.

Owens-Illinois' Multiwall Bag Div. has recently reported three plant manager appointments:

Howard J. Dyer, formerly with St. Regis Paper Co. and Chase Bag Co. and on the Owens-Illinois staff since 1956, becomes manager of the multiwall bag plant at Jaite, Ohio. James Kudrna, associated with National Container prior to the merger, is paper mill manager at Jaite. And Albert S. Grayson Jr., with 19 years' experience in the paper bag industry, was named manager of the multiwall bag plant at Valdosta, Ga.

F. B. Schelhorn

D. J. Brett Jr.

In another O-I promotion, D. J. Brett Jr. was named personnel manager for the Mill Div. For the past year he has been personnel manager at the Valdosta paper mill. He joined National Container in 1939.

Container Corp. Appoints

George H. Watkins, vice president in charge of development for the University of Chicago, has joined the management group of Container Corp. of America. He was to be recommended for election as a vice president of the corporation.

Watkins will be directly concerned with foreign operations, design, advertising and public relations.

In another Container Corp. appointment, Fritz Lothman has been named manager of the Oakland, Cal. plant of Sefton Fibre Can Co. He formerly held a similar position at Portland, Ore. (Sefton Fibre Can is a subsidiary of Container Corp.)

Correction

In the June issue of The PAPER INDUSTRY it was reported that Dr. Klaus Rosenfeld had been appointed director of research at the Covington, Va. research laboratory of West Virginia Pulp & Paper Co. This was in error. Dr. Rosenfeld's appointment was to research engineer.

Abitibi Promotes Morrison at Ft. William

John G. Morrison, formerly assistant manager of the Fort William, Ont. mill of Abitibi Power & Paper Co. Ltd., has been appointed manager to succeed J. T. Carey. Carey has retired after 23 years' service with the firm.

A graduate of the University of British Columbia, Morrison began his career in the pulp and paper industry in 1938 as assistant plant chemist for British Columbia Pulp & Paper Co. at Port Alice, B. C. He joined Abitibi in 1948 as senior chemist in the Central Research Laboratory at Sault Ste. Marie, Ont.

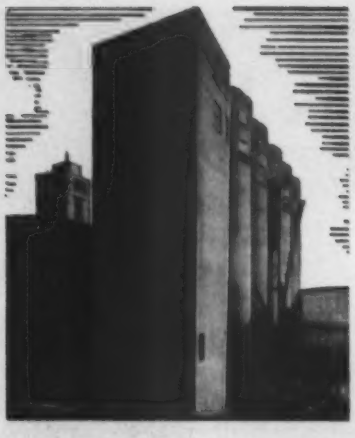
Carey, who has devoted 46 years to the industry, joined Abitibi as a newsprint machine tender at the Iroquois Falls, Ont. mill.

Beckwith Retires at Federal Paper Board

William H. Beckwith, president of the Morris Paper Mills Div. of Federal Paper Board Co., retired July 1. He continues as a director of Federal, will serve as a consultant until the end of the year and will handle special assignments.

Beckwith began his career in the industry with American Box Co. in 1903. In 1916 he became vice president, general manager and a director of the newly organized Morris Paper Mills at Morris, Ill., and in 1933 was elected president.

Another retirement recently re-



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Names in the News . . .

ported by Morris is that of F. Verne Powell, manager of the Marion, Ind. plant (formerly Lindley Box & Paper Co.). Powell's career in the industry began in 1900 with Sefton Mfg. Co. in Anderson. He later joined Lindley Box & Paper and was president of that firm when it was acquired by Morris Paper.

W. H. Beckwith

V. M. Stouck

Stouck Retires at New York & Penn

Vinson M. Stouck has retired as vice president and general manager of New York & Pennsylvania Co. He continues as a company director and special consultant at his office at the Lock Haven, Pa. mill.

Stouck joined the firm in 1899 and in 1918 became assistant to Gibson Paine, who was then vice president and general manager. He succeeded Paine in 1935.

Coincident with Stouck's retirement the firm announced a basic change in organization, establishing a framework for decentralization of management. Under the plan there will be four major operation divisions, each under a division manager.

The division managers will be: G. P. Stouck, Lock Haven; Neal Jones, Johnsonburg; E. O. Ehrhart, president of Armstrong Forest Co., wood division, and Marshal M. H. Dana, sales division.

Ketchikan Pulp Co. of Ketchikan, Alas., has announced the following staff changes: **Vic Haner,** resident manager since 1954, becomes vice president and resident manager, and **Dr. Robert B. Brown** of Bellingham, Wash., technical consultant for the firm, becomes vice president-technical sales.

Alfred B. Clark, assistant director of labor relations for St. Regis Paper Co., has been named director of labor relations for Brown Co. in Berlin, N. H. At one time he was personnel manager at St. Regis Paper's mill in Jacksonville, Fla.

Karl E. Buff has been appointed technical director in charge of research and new product development at Eaton Dikeman Co., Mt. Holly Springs, Pa. A graduate of the Institute of Paper Chemistry, he was formerly associated with Congoleum-Nairn Inc.

W. T. Peterson has been named plant engineer for Minnesota & Ontario Paper Co.'s specialty paper and Insulite fiberboard mill at International Falls, Minn. He was formerly a research fellow at the University of Minnesota concerned with the study of building material products.

Fred Herbolzheimer, formerly production services superintendent, has been named production manager for Thilmany Pulp & Paper Co. at Kaukauna, Wis. He was at one time production manager for Marinette Paper Co.

T. Richard Probst, since 1954 vice president and manager of mills for Eastern Corp., has been appointed vice president in charge of operations for Brown Co. And **Robert W. Andrews,** vice president, has assumed charge of general engineering and capital projects at Brown Co. plants.

T. R. Probst

Martin Kirchhoefer

Martin Kirchhoefer, for the past 12 years purchasing department engineer, has been named to the new position of industrial engineer for Consolidated Water Power & Paper Co.

Dr. C. L. Garey has joined the staff of the Institute of Paper Chemistry at Appleton, Wis., as research associate. He will be engaged chiefly in the fundamental study of clays, their behavior in liquid suspension and their use in paper coating. He was formerly a staff member at the

Arkansas Agricultural Experiment Station.

Dr. Arthur M. Stern, an assistant professor of bacteriology at Rutgers University, has been appointed to the staff of West Virginia Pulp & Paper Co.'s research center at Covington, Va. He will be available to all the company's mills for consultation and study of microbiological problems, including pollution abatement and slime control.

Clarence L. Van Schaick, formerly president of Dixie Cup Co., has been elected a vice president of American Can Co. He will be in charge of Dixie operations. (Dixie Cup was recently merged with Canco.)

C. L. Van Schaick

J. R. Parkinson

John R. Parkinson, project chemist at the Springfield, Ore. pulp plant of Weyerhaeuser Timber Co., has been given the Westbrook Steele Award for 1957 by the Institute of Paper Chemistry, Appleton, Wis. The prize is given each year for the outstanding thesis submitted by a Ph. D. candidate at the Institute.

Allied Personalities . . .

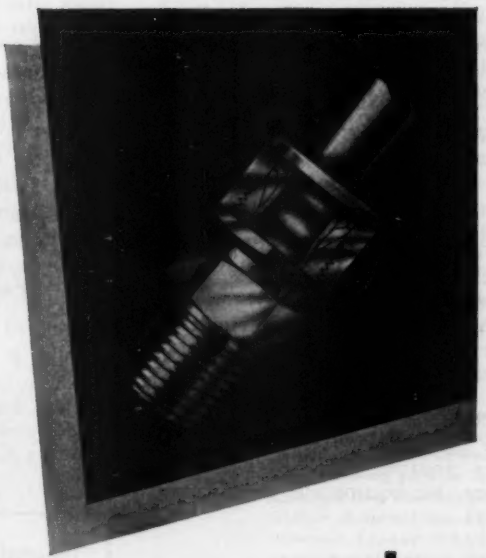
Leonard P. Bourgeois, a 22-year veteran with the firm, has been made Midwest district sales manager for Hudson Sharp Machine Co. of Green Bay, Wis. **Richard E. Jansing,** formerly a sales engineer in New York and Ohio, has been named district sales manager for the southern, western and Canadian territories.

A. R. Downing has been appointed manager of the spray dryer department of Swenson Evaporator Co., a division of Whiting Corp. He was formerly resposible for the engineering of spray dryers.

Lunkenheimer Co. of Cincinnati has announced three appointments and one transfer in sales personnel. **Glenn Hill** and **Bob Miles** will represent the firm in Cincinnati and Los Angeles, respectively; **Lowell**

Swagelok®

TUBE FITTINGS



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Names in the News . . .

Barton, a sales trainee, will be assigned a territory this fall, and **Phil Stokes,** formerly at the New York, N. Y. office, will serve as a representative in Iowa, Nebraska and South Dakota.

James J. Barrett has been named manager of extrusion sales for Babcock & Wilcox Co.'s Tubular Products Div. He joined the firm in 1954 and has been associated with the development of extruded products.

W. R. Monroe, formerly executive vice president, has been named president of Johnson Corp. He succeeds **R. O. Monroe,** who becomes board chairman. **R. W. Gotschall,** formerly sales manager, becomes vice president in charge of sales; **T. O. Monroe,** secretary and treasurer of Johnson Export Corp. and vice president of Johnson-Hamstra of Weesp, Holland.

Ralph S. Johnston, associated with the firm since 1911, has retired as vice president of Pusey & Jones Corp. He became vice president in 1944.

H. B. Horton, board chairman of Chicago Bridge & Iron Co., was honored recently on the occasion of his 50th anniversary with the firm. He has been a director since 1913, was treasurer from 1913 to 1947, president from 1945 until he was elected chairman in 1956.

Victor Johnson, formerly assistant to the general sales manager, has been made sales representative for Cameron Machine Co. in Illinois, Iowa, Mississippi, Missouri, Arkansas, Louisiana and Texas.

Lawrence B. Lane, formerly with Carrier Air Conditioning Corp., has been appointed a sales engineer for Albany Felt Co. His territory includes parts of Pennsylvania and Maryland.

Wilford O. Schwartz, a general salesman, has been named sales manager for the St. Louis steel service plant of Joseph T. Ryerson & Son Inc.

Frank W. Egan, founder and former president, has been elected chairman of the board of Frank W. Egan & Co., of Somerville, N. J. He is being succeeded as president by **Edward F. Egan,** former vice president.

J. E. Andrews, who has held several positions in the Southern Div., has been named Fort Smith, Ark. branch manager for Corn Products Sales Co.

Walter Welch, at one time chief chemist for Falulah Paper Co., has been appointed technical representative for sales development of paper processing products by E. F. Houghton & Co.

K. G. Looker has joined R. A. Goodwillie in the West Coast office of Beloit Iron Works. Looker has been associated with Beloit Iron Works 13 years.

Enrique (Henry) Gremler, formerly with Fleetwood Chemical Co., has been named technical director for the Pandia Div. of Black-Clawson Co.

John F. Tourtellotte, a process engineer, has been transferred to the Detroit district sales office of Swenson Evaporator Co., a division of Whiting Corp.

Necrology . . .

John P. Kennedy

John P. Kennedy, a special consultant to Sorg Paper Co., died August 10 in Middletown, Ohio. He was 61.

Kennedy, prominent papermaker associated for many years with American Writing Paper Corp., was executive vice president and general manager of Modena Paper Mills Inc. until that firm was purchased by Hopper Paper Co. of Taylorville, Ill. He joined Sorg about nine months ago.

Considered an authority in the field of paperboard manufacture, Kennedy was general superintendent at AWP. He was also associated with such firms as Lion Match Co. Inc., Champion-International Co. and the former Pacific Paperboard Co.

Willard G. Leathers

Willard G. Leathers, 51, executive vice president of Doeskin Products Inc., died August 22 at Mount Kisco, N. Y.

Leathers became associated with Doeskin in 1955 as administrative assistant to the president. Prior to joining the Doeskin staff, he had been with Hubbs Corp., and at one time he was secretary of the National Paper Trade Association.

Burton A. Ford, associated with St. Regis Paper Co. since 1928, died in August at his Allentown, Pa. home at the age of 63. He was a member of the general staff of the Multiwall Bag Div. and had served in various sales management capacities. He was at one time sales manager for Bates Valve Bag Corp. prior to its acquisition by St. Regis. From 1922 to 1926 Ford was general manager of the National Lime Association.

F. Ray Peterson, 55, assistant to the president of R. G. LeTourneau Inc., died July 29 at his home in Longview, Texas. He joined the LeTourneau organization in Peoria, Ill., and helped design many of the machines the firm now produces.

Clarence E. Cross, 55, president of Foster & Cross Inc., Brooklyn paper box manufacturer, died recently at his Garden City, L. I. home. He had been a director of the National Paper Box Manufacturers Association.

Harold T. Edgar, 79, former president of Edgar Bros. Clay Co., died at a New York, N. Y. hospital recently. He joined Edgar Clay in 1900 and was instrumental in the development of the first successful clay coating for the paper industry. It was named "H. T. Coating Clay" in his honor.

Frederick R. Sisson Jr., managing editor of *Paper and Paper Products,* died in August at New York, N. Y. Sisson, 49, had been associated with Walden, Sons & Mott Inc. several years.

Robert Parks Munger, 78, president of Ohio Paper Co. in Miamisburg, Ohio, since 1933, died in August. He was a co-organizer and former vice president of Lloyd A. Fry Roofing Co. and Valley Felt Mills Inc.

David E. Linn, 50, manager of sales service for Corn Products Sales Co., died in Englewood, N. J., August 6. He joined Corn Products as a trainee in Argo, Ill., in 1930. He became assistant manager of the Sales Service Department in 1939 and was named manager in 1956.

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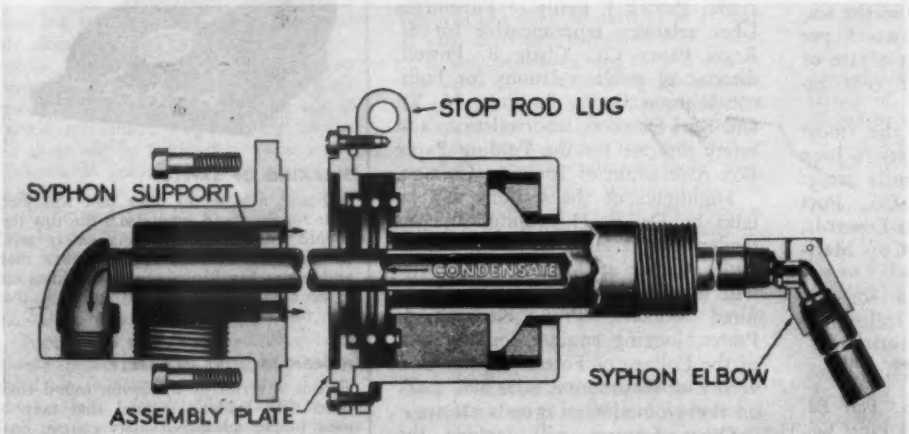

Type SDP SUPER Johnson Joint, which combines "Green Streak" rings and Ni-Chrome plated wearing surfaces for unusually long wearing, low friction characteristics. The Johnson Syphon Elbow, shown at right in picture, permits replacing unwieldy curved syphon pipes with two straight pipes; it hinges to pass right through joint, seats of its own weight when in position. Special assembly plate is provided to hold internal parts of joint in position when head is removed to get at syphon pipe.

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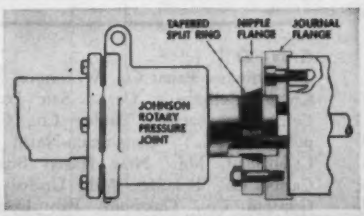

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SAFETY NEWS

137 Perfect Scores Reported to NSC in Six-Month Period

FOR THE SIX months ending June 30, a total of 137 contestants have reported perfect scores in the 1957 Paper Industry Safety Contest sponsored by the National Safety Council. Some 602 mills are entered in the competition. This compares to 105 perfect records for the same period a year ago. At that time there were 535 contestants.

The January-to-June frequency rate for Divisions I and II was 6.96, up 2 per cent from 1956. Pulpwood Logging (Division III) registered a 90.12 frequency, up 53 per cent from a year ago.

In the Pulp & Paper Div. the six-month rate was 6.53, down 1 per cent. In Paper Converting a rate of 8.08 represented a 7-per cent increase from a year ago.

Contestants working the most man-hours in the January-to-June period with perfect records were: Nekoosa-Edwards Paper Co., Port Edwards, Wis.; Nekoosa-Edwards, Nekoosa, and Flintkote Co., Meridian, Miss.

Perfect scores recorded for the first six months were as follows:

Division 1—Pulp and Paper Mills

Group A

Nekoosa-Edwards Paper Co., Port Edwards, Wis.; Nekoosa-Edwards Paper Co., Nekoosa, Wis.

Group B

Crown Zellerbach Corp., Port Townsend, Wash.; Marinette Paper Co., Marinette, Wis.; LongLac Pulp & Paper Co. Ltd., Terrace Bay, Ont.; Brunswick Pulp & Paper Co., Brunswick, Ga.; Escanaba Paper Co., Escanaba, Mich.; Chesapeake Corp. of Virginia, West Point, Va.

Group C

Chillicothe Paper Co., Chillicothe, Ohio; Blandin Paper Co., Grand Rapids, Minn.; Falls Paper & Power Co., Oconto Falls, Wis.; Schmidt & Ault Paper Co., York, Pa.; National Vulcanized Fibre Co., Yorklyn, Del.; Neenah Paper Co., Neenah, Wis.; Fraser Companies Ltd., Newcastle, N. B.; Fibreboard Paper Products Corp., Vernon board mill, Los Angeles; Riegel Paper Corp., Warren Glen, N. J.; Cornell Paperboard Products Co., boxboard mill, Milwaukee.

Group D

Strathmore Paper Co., Woronoco, Mass.; Crown Zellerbach Corp., San Leandro, Cal.; Weyerhaeuser Timber Co., Cosmopolis, Wash.; Congoleum-Nairn Inc., Cedarhurst, Md.; New Haven Board & Carton Co., Ilchester, Md.; United States Gypsum Co., Oakmont, Pa.; Container Corp of America, Ogden plant, Chicago; Marathon Corp., Ashland, Wis.; Fibreboard Paper Products Corp., Port Angeles, Wash.; Certain-Teed Products Corp., Savannah, Ga.; Fort Orange Paper Co., paper

(Continued on page 548)

45th Congress Set For October 21-25

Promoting safety not only in the plant, but also in the community will be the theme of the Pulp & Paper Section's meetings at the 45th annual National Safety Congress. The Congress will be held October 21-25 at Chicago.

Keynoting the pulp and paper sessions will be Rex Paxton, director of public relations for Sutherland Paper Co., Kalamazoo, Mich.

Others on the program will include: Patrick J. Reilly of Pittsburgh, labor relations representative for St. Regis Paper Co.; Clyde R. Powell, director of public relations for Endicott-Johnson Corp., Endicott, N. Y., and Karl Simpson, labor relations and safety director for the Folding Paper Box Association of America, Chicago.

Highlights of the sessions will be talks by Dr. B. H. Young, superintendent of the Hospital and Rehabilitation Center at Malton, Ont., who will discuss the rehabilitating of injured workers; Prof. Kenneth J. Pearce, logging engineer on the staff of the College of Forestry at the University of Washington, who will speak on the promotion of woods safety.

Other features will include the presentations of the Fritz and Scott awards for the best over-all safety programs for both single- and multiple-location plants. The Edward Benton Fritz Memorial Trophy is sponsored by Fritz Publications Inc., publisher of THE PAPER INDUSTRY.)

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FOREIGN ABSTRACTS

Studies on flotation savealls

This is a resumé of an unusually basic study of the flotation process, and of various problems connected with its practical application. Some of the questions studied include the effects of various flotation agents on the materials used in papermaking; the search for an ideal, universal flotation agent; various electrical phenomena involved in flotation; the effects of pH, cations, etc. on flocculation phenomena; the importance of air injection; technological flow requirements, and the importance of these various factors on the practical application in flotation savealls.

Many of the common flotation reagents have used glue, rosin or turkey-red oil modifications, although other surface-active agents (such as sodium lauryl sulfate) have also been studied. Very often a stock suspension that is completely free from cations does not lend itself to flotation, but there are some exceptions which are discussed. For example, when coarse mildly hydrophilic fibrous particles are present and show only relatively slight electric repulsive forces (as in the case of certain mechanical pulps) finely divided air alone may be sufficient to cause proper flotation. In general, however, cations are required; these are sorbed on the negatively charged particles of suspended matter. In practice, aluminum salts are used, and while these may already be present from previous sizing operations, other additions may be required in the circulation of the flotation saveall.

Prior to flotation, marked flocculation should occur, and this is quite different from the isoelectric point reached by certain colloids. Special flocculating agents are required whose constitution permits them to serve also in flotation. Such agents often have a hydrophylic "head" and a relatively long hydrocarbon chain (suitably substituted), which is capable of remaining perpendicular to the adsorbent, thus giving rise to a water repelling zone, into which finely divided air can penetrate. Although many such flotation agents are known, their action is often specific for certain pulps and not for others, and they are not universally applicable.

Certain mills, through fortunate happenstance, have found a highly successful flotation agent, which keeps them free from flotation problems. Other mills might find this same agent inapplicable. The authors studied the molecular configurations of various organic macromolecules and arrived at the nearly ideal flotation agent (termed "Supernatin"). Apparently Supernatin can cause the flotation of any paper stock and can even cause flotation of metals. It causes no slime formation and does not discolor the pulp. Often the air required in the flotation is supplied within the suspension itself during the process of clarification (by means of the vacuum pump intake). Usually the pH of the suspension in the saveall lies between 4 and 7. Although flotations may be carried out successfully in the laboratory in large cylinders, these findings must then be adapted to mill practice. Here certain difficulties may arise. E.g., too little time may have been given to cause flocculation, or the dimensions of the saveall may be too small.

Flocculated particles may be broken down by excessive rates of flotation, or by sudden acceleration of the process. Some of the suggestions made in meeting these difficulties include: introducing the flocculating agent into the system before the saveall is reached so that there is regular mixing with sufficiently slow flocculation. Any specific interferences in saveall flocculation may be monitored in the laboratory and can often be obviated as a result of such small scale experiments. In general it is uneconomical to try to take out the last traces of stock from the white water. In general, 10-20 milligrams per liter of suspension are best left in the suspension, otherwise too much flotation agent will be required. Often the clearest white water is that from heavily loaded stock. The relative hardness of the mill water and the temperature of that water are without influence on flotation procedures. Thirty-two references and 31 figures.

F. Wultsch and H. Hogenkamp. *Wochbl. Papierfabrik.* 85, 283-294 (1957) (In German.)

The alkaline iron tartrate complex as a cellulose solvent

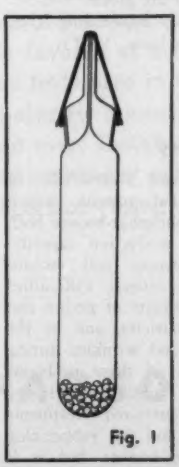

Fig. 1

The new solvent originally proposed by Jayme Bergmann (cf. THE PAPER INDUSTRY 38,533,1956) was somewhat simplified by the present author, who has termed it "FeTNa".

The new method of preparation permits a lower concentration of the solution, which is odorless and also extremely stable. The reagents used were the following: 121.206 grams ferric nitrate (9 H_2O); 207.09 grams sodium tartrate (2 H_2O), and 96 grams sodium hydroxide per liter of solution. The sodium tartrate is dissolved in 400 ml. hot water, cooled and then treated with the ferric nitrate in 160 ml. water, with stirring and in the absence of light. The mixture is then cooled to 10 deg. C, and the sodium hydroxide in 200 ml. water is added very slowly so that the temperature does not rise above 15-20 deg. C. The final color is yellowish green. The mixture is then introduced into a one-liter flask containing 5 grams sodium tartrate as stabilizer, and *rapidly* made up to the mark with water.

The solution is kept 24 hours and filtered through glass if necessary; although the reagent is very stable, it may be filtered at intervals during storage without material change in solvent properties. Details are given for making up cellulose solutions in FeTNa in the tube shown in Figure 1. The concentrations of such solutions varied from 0.2 to 1.0 per cent and showed very little change in viscosity on storage. The FeTNa cellulose solutions have many advantages over those in cupriethylenediamine (Cuen). The conversion of the former to the latter is indicated by the relationship η (in FeTNa) $= 1.14 \times \eta$ (in Cuen). A full description of the viscosity measurements in FeTNa is given. Viscometers are cleaned with warm dilute hydrochloric acid, followed by water.

Three references, five figures and five tables are included.

Lea Valtasaari. *Paperi ja Puu* (Finland) 39,243-252 (1957) (In English).

New moisture meter for paper

Two forms of a new instrument were developed, one for the laboratory testing of sample sheets and another for recording continuously the moving web on a paper machine.

The electrical resistance of the paper is measured between two electrodes spaced on the same side of the sheet. The difficulties of non-uniform contact pressure and static are avoided by using an alternating current; the circuit produces an amplified pure resistance measurement by cancelling out the capacity of the sample and measuring system. Large changes in conductivity are measured for the moisture range covered, and the instrument is very insensitive to basis weight changes and certain other variants. The factors that might affect conductivity are considered; much depends on the furnish used.

For example, papers made from mechanical pulp are less conducting than are those produced from chemical pulp. Usually, unbleached papers are less conducting than are those that contain bleached stock. Fillers in small amounts may be negligible in their effects, whereas large amounts of

loading material may increase the conductivity of the paper. These factors are discussed.

The calibration of the meters for various types of paper is carried out very easily, and the instruments require very little mechanical maintenance. In the moisture range of 3 to 10 per cent, the operation of the meter (termed "Aquatel"), when applied to the paper machine, shows an accuracy of ± 0.2 per cent. A higher accuracy was obtained when individual paper samples were tested.

Operational experience over a five-year period with a wide variety of papers is described, and the principles involved in the test are discussed. Five figures.

J. A. Hart and W. Gallay. *Pulp Paper Mag. Can.* 58, No 3,195-200 (Convention issue 1957).

Beating studies with a Jokro mill

In an extensive series of investigations, the author collected comparative data on beating at the Finnish Pulp and Paper Research Institute, in collaboration with various institutes in England, Norway and Sweden.

In these older studies, the Valley Beater, the Lampén Mill, the Aylesford Laboratory Beater, the PFI Mölle, the Banning-Seybold Beater and the Noble & Wood Beater were all used. However the Jokro mill (Fig. 2), which serves in beating stock which is to be used in the German Standard Pulp Testing Method for pulp strength, was not included in previous studies. The Jokro mill was now tested in

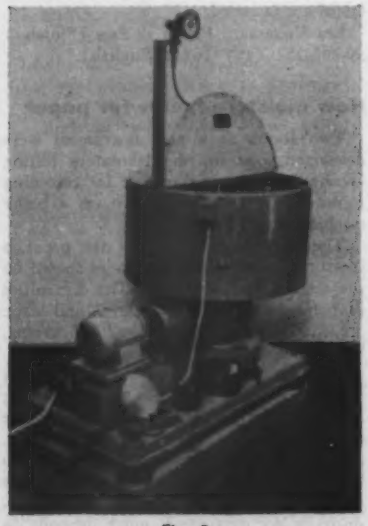

Fig. 2

comparison with the Valley Beater, and the German method for pulp testing was compared with the Finnish method (A 1101). Pulp sheets were made after beating in the Jokro mill and then tested both by the German and by the Finnish methods. (The German method involves the use of the "Rapid-Köthen" sheet machine.)

The results indicated that pulp is beaten somewhat more rapidly in the Jokro mill than in the Valley beater. For all pulp qualities, the Jokro mill develops a lower tearing strength than that given by the Valley beater. The tensile and bursting strengths developed in the Jokro mill were higher for sulfite pulps but lower for kraft pulps than were those found when a Valley beater had been used.

When bleached sulfite pulps were tested by the German method, the values obtained were practically the same as those found when Finnish method A 1011 was applied. Irrespective of which testing method was applied to unbleached sulfite, or to bleached and unbleached kraft pulps, the respective tearing strengths found were usually approximately the same. By the German testing method, the tensile and bursting strengths were higher for unbleached sulfite and lower for bleached and unbleached kraft pulps than were those found by the Finnish method. In general pulp samples could be differentiated just as satisfactorily by using the Jokro mill as by using the Valley beater; this included the findings with bleached sulfite pulps.

Eight references, 12 graphs and six tables. T. Ekstam. *Paper and Timber* (Finland) 39, 309-316 (1957) (in English).

New wet strength tester

A zero-span wet-web strength testing apparatus is described, and its application in paper mill process research and control is discussed. The instrument permits the estimation of strength at any particular solids content (within a range of 12-22 per cent) with an average standard deviation of 0.5 per cent. Thus its precision is considerably better than that reported for other methods and instruments. The present apparatus was designed specifically for use with groundwood and newsprint stocks, but it appears that, with some modifications in the procedure, it could be applied to other stronger pulps such as kraft and sulfite.

Three half-tones, nine graphs, four tables and 17 references are given.

J. R. McCallum. *Pulp Paper Mag. Can.* 58,232-40 (Convention issue, 1957).

Perlon screens in the paper industry

Perlon has been used successfully in cyclindrical and in flat screens, which equal those made of phosphor-bronze both in durability and in production capacity.

Some problems however still require future solution; these include difficulties caused by the hygroscopicity of perlon and its affinity for dirt particles, and by the formation of bubbles and wrinkles during sheet formation. Some of these problems have been met with partial success by "hydrophobing" and infra-red treatments of the perlon wire, and by rubberizing marginal parts of the screens, but it is evident that before perlon screens can be used universally on all types of paper and board machines further improvements are required.

G. Drechsler, *Zellstoff u. Papier* 6. No 1,12-14 (1957) (In German); through *B.I.P.C.* 27, No 9,917-18 (1957).

Pitch troubles; the effect of levopimaric acid

The resin found in freshly collected red pine (*Pinus densiflora*) oleoresin contained large amounts of levopimaric acid which were slowly reduced by isomerization to other acids over a six-month period. After 12 months seasoning the amount had dropped to about one half of that originally present. The resin acid from pine sapwood contained about 5 per cent levopimaric acid, and this was reduced to nearly zero after seasoning for 12 months. The resin acids from pine heartwood contained the least amount of levopimaric acid. The change in the total levopimaric acid content of the resin acid may be considered a measure of the reduction of pitch troubles by seasoning—and one year's seasoning was found to eliminate practically all the levopimaric acid from red pine.

Eight references and five tables are included. Kaoru Kuroki. *J Japan Wood Research Soc.* 3, No. 2, 57-62 (April 1957) (in Japanese with an English summary) through *Bull. Inst. Paper Chem.* 27, No. 11,1280 (1957).

Various laboratory experiments involving alkaline cooks

A series of laboratory digestions of pine wood was made with sodium hydroxide solutions to which various reducing agents had been added. None of these pulps showed the effects of the added reducing agents that were in any way comparable with those of sulfides ordinarily used in the kraft cook. Measurements of the redox potentials at different stages of various hydrosulfide and sulfite cooks indicated that the redox potential of the cooking liquor at the start of the digestion does not parallel its effectiveness in dissolving lignin and hemicelluloses. However, the dissolved substance substantially lowers the redox potential.

When sprucewood sawdust was pretreated with 4 per cent sodium hydroxide at room temperature, this did not appreciably alter the solubility of the dissolved lignin in organic solvents. However, the lignin that was dissolved during the course of a kraft cook was much more soluble in 95 per cent alcohol and much less easily precipitated from an ethanol-acetone solution by isopropanol than was the corresponding lignin dissolved during a soda cook.

The authors believe that the "sulfate" lignin has a markedly lower average molecular weight than has the "soda" lignin. Some of the reducing substances (such as glucose, as well as some others) added to the soda cook actually had a strong deleterious effect on the delignification.

Four tables and 38 references are given. T. Enkvist, B. Holm, A. Kourula, and J. E. Martelin, *Paper and Timber* (Finland) 39, 297-302 (1957) (in English).

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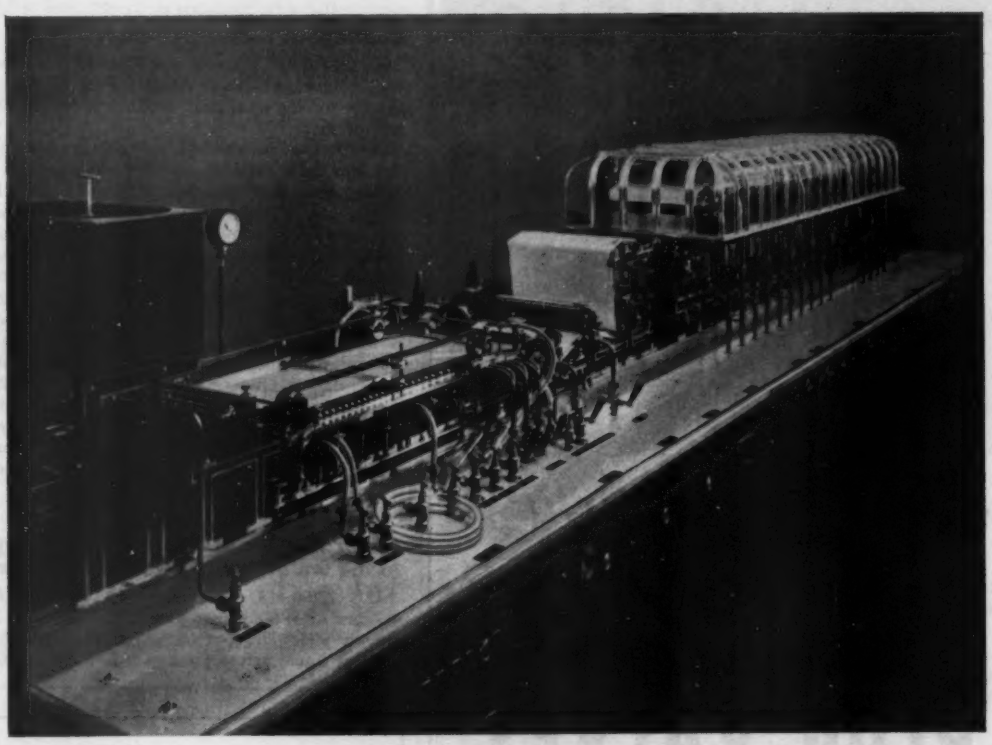

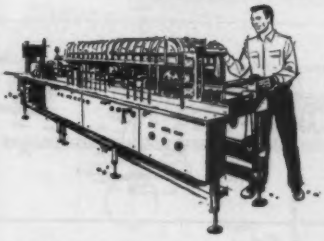

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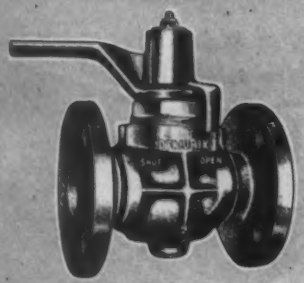

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PATENT REVIEWS

MELVIN NORD*

Continuous cooking of chips

U. S. 2,789,051, issued April 16, 1957, to David N. Obenshain and assigned to West Virginia Pulp & Paper Co., describes a process for the continuous cooking of wood chips in the preparation of pulp.

Attempts at providing a continuous cooking process generally run into difficulties because of the introduction of strong cooking liquor along with the chips into a digester which is at cooking temperature. This results in a very drastic action of the liquor on the exterior parts of the chips, severely damaging the outside fibers, while the interior portions receive inadequate treatment. In order to avoid this, multiple-stage systems have been proposed, but these are excessively complicated in construction and operation.

In the present invention, the liquor introduced with the chips is only silghtly stronger in active cooking agent than that discharged with the cooking chips, thereby avoiding damage to the chips. But, this liquor circulates co-currently through the advancing mass of chips at a rate which is 10-100 times as fast as the chip movement. Thus, the chips are never contacted by strong cooking liquor, and yet there is a sufficient supply of the active cooking agent to accomplish the necessary degree of cooking.

Apparatus for continuously applying liquids to the underside of a felted fiber mat

U.S. 2,790,413, issued April 30, 1957, to Arthur S. Gregory, assigned to Weyerhauser Timber Co., describes a method of spraying the underside of a felted lignocellulose fiber mat with water or other liquid before pressing it in the manufacture of fiberboard.

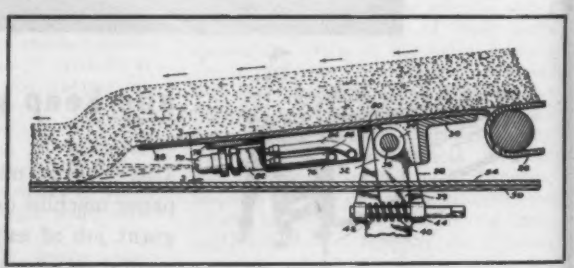


Fig. 1

As shown in Fig. 1, the mat travels on a downwardly-inclined transfer belt 26, is transferred to a metal supporting member 28 and then drops down to a conveying belt 50. Liquid is sprayed onto the underside of the mat from spray heads 70 as the mat is falling onto the conveying belt.

Production of semichemical pulp

U.S. 2,791,503, issued May 7, 1957, to Malcolm G. Lyon and Robert P. Green, assigned to The Champion Paper & Fibre Co., describes a method of disintegrating and defibering cooked chips to produce a semichemical wood pulp which is free of shives and which can be bleached to a high brightness with an improved retention of freeness.

The hardwood chips are cooked to an unbleached yield, basis wood, of 55-70 per cent. The resultant stock is passed at a consistency of 20-50 per cent, under pressure between opposed, relatively moving surfaces exerting a combing action on the stock, the surfaces being maintained at a clearance of at least 0.60 in.

*Patent attorney, 17600 Pinehurst, Detroit 21.

The combing action is continued until the rejects on a 0.012-in. cut screen are between 2 and 6 per cent. After removal of the shives and after bleaching, the stock has a brightness of at least 70 and a freeness of at least 200 cc. as measured after ball-milling for 100 min.

Paper stock distribution box

U.S. 2,791,947, issued May 14, 1957, to Raymond P. McGinley and Gilman C. Boardman, describes a stock box for papermaking machines in which stocks of different characteristics may be mixed in definite proportions and fed to several papermaking machines.

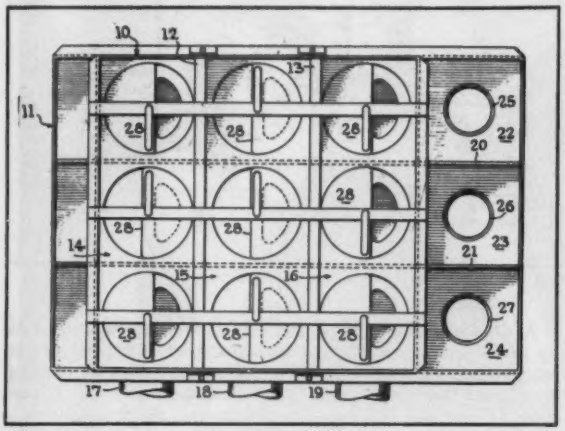


Fig. 2

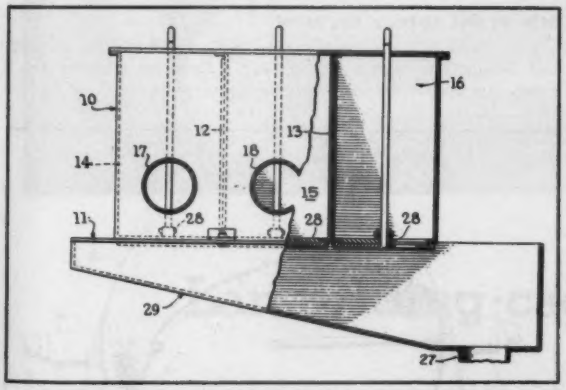
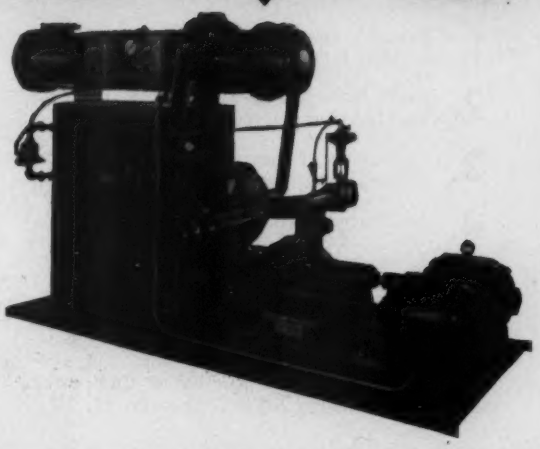


Fig. 3

As shown in Figs. 2 and 3, the stock box includes a pair of receptacles 10 and 11 mounted one above the other. The upper receptacle 10 is partitioned at 12 and 13 to provide three separate compartments 14, 15 and 16. Stock inlet pipes 17, 18 and 19 are connected to these separate compartments. Partitioning means 20 and 21 are provided for dividing the lower receptacle 11 into separate compartments 22, 23 and 24. For each compartment in the lower receptacle 11, there is provided a stock outlet conduit, 25, 26 and 27.

The compartments of the upper receptacle are separated by valves 28 from the compartments of the lower receptacle. There are nine such independently operated valves. The three valves 28 which control the mixture of stock supplied to outlet 27 are

The Only Vacuum Pump Designed Exclusively for Paper Machine Drainage



Here are 7 big reasons why the Stickle jet-type vacuum pump provides better paper machine drainage at lower cost—year after year:

1. Designed Exclusively for Paper Machine Drainage. The only vacuum pump engineered to meet the particular problems of paper machine drainage.

2. Maintains Higher Efficiency Longer. Keeps dryers free of condensate and air; returns condensate to boiler room at maximum temperature. Efficiency is maintained year after year because there are no close tolerances to cause wear and loss of vacuum.

3. Fewer Failures. Duplex model has duplicate pumps, motors and controls to prevent costly interruptions. Standard horizontal motors are readily available if replacement is necessary.

4. Built-in Heat Exchanger. The only vacuum pump with built-in heat exchanger. There's no need for costly cooling equipment or for mixing corrosive raw feed water to condensate return.

5. Shorter Heat-up Period. Increased production due to shorter heat-up period possible with a Stickle vacuum pump will often pay for the unit in less than one year.

6. Lower Maintenance Cost. Requires less time and expense to service. All floats are housed in exterior float boxes. Vacuum chamber is interchangeable. Ejector tubes may be inspected without moving motor, pump or piping. Standard horizontal motors are easily replaced. And, there are no close tolerances to cause excessive wear.

7. Greater Flexibility. A future increase in capacity of 25% is possible at small cost, due to a special built-in feature. Drying pressure changes may be handled automatically.

The Stickle vacuum pump handles vacuums up to 28" with 90° condensate. Single and duplex models, each in 11 sizes. Capacities for single model up to: 150 GPM (water) and 150 CFM (air); or 450 GPM (water only). With duplex model, these capacities are doubled. Every installation guaranteed. So, if you want better paper machine drainage at lower cost, get the full story on the Stickle vacuum pump. Write for free bulletin No. 260.

STICKLE STEAM SPECIALTIES COMPANY

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Moisture Control Systems
Dryer Drainage Systems
Feed Water Heaters
Vacuum Pumps
Micro Adjustable Orifices
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Stock Level Control provides:

1. Instant response to either small or sudden large changes in stock level
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3. Operation of minimum and maximum flow valves in sequence
4. Unlimited turndown
5. Lowest maintenance cost for any stock level control element

For *complete* information on what it does, where and how it can be applied, and how it works, send for bulletin Nos. 165 and 26.3. Write Askania Regulator Company, 294 East Ontario Street, Chicago 11, Illinois.

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Suction Box Covers now lead

No other Suction Box Cover offers you so many advantages . . . that's why Mill after Mill have joined the fast growing parade of users.

PROVEN BY TEST, this RES-LIN Suction Box Cover is establishing a new record for longer life and even wearing. It is engineered to meet the requirements of specific production problems of each particular paper machine.

1. Even distribution of fabric assures EVEN WEARING.
2. Ends of threads contact wire, assuring uniform surface to wire.
3. Increased wire life.
4. Many years of trouble-free service.
5. Resurfacing reduced to a minimum.
6. Expansion and contraction is reduced to a minimum.
7. Reslin can supply a greater open area without sacrificing strength.
8. Requires no wet storage or care when machine is down.
9. Easily installed.
10. No other can offer as even-wearing and wax-like surface as Reslin.

WIRE RES-LIN SAVER

Write for Further Information and Sample of Material

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APPLETON WISCONSIN

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MONTREAL 20, QUEBEC
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Patent Reviews . . .

shown with two fully opened and one fully closed. The stock mixture fed to the outlet 27 would therefore consist of equal parts of stock from the inlets 17 and 19.

Apparatus for continuous chemical cleaning and conditioning of paper mill wet felts

U.S. 2,792,258, issued May 14, 1957, to Dudley A. Huber, describes a method and apparatus for the continuous chemical cleaning and conditioning of paper mill wet felts. The solution used contains a detergent agent and a bactericide.

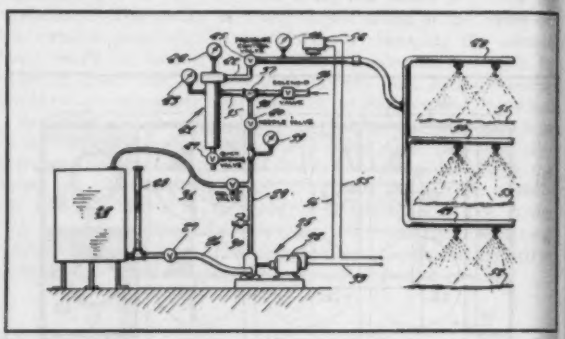

Fig. 4

As shown in Fig. 4, incoming water, controlled by water valve 38 passes through pipe 36 and into line 35 where it is mixed with the compound from line 29 delivered from the drum 24 by pump 25, passing through the gage 39. The solution then passes through filter 41 and into the main line 42 through the pressure control valve 45. The solution is then delivered on the wet felts from the sprays or showers 48, 49 and 50.

Stirrer for rotary digester

U.S. 2,793,117, issued May 21, 1957, to Ward D. Harrison and assigned to Riegel Paper Corp., describes a stirrer for a rotary digester for use in the production of pulp.

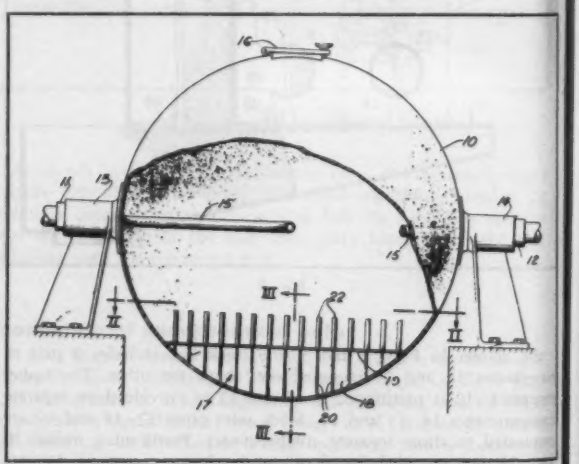

Fig. 5

The rotary digester 10 is shown in Fig. 5. Steam enters the digester through the hollow trunnions 11 and 12 by means of steam pipes 15.

In operation, the digester is filled about ¾ full with a mixture of raw material and liquor. The cover 16 is closed and the digester

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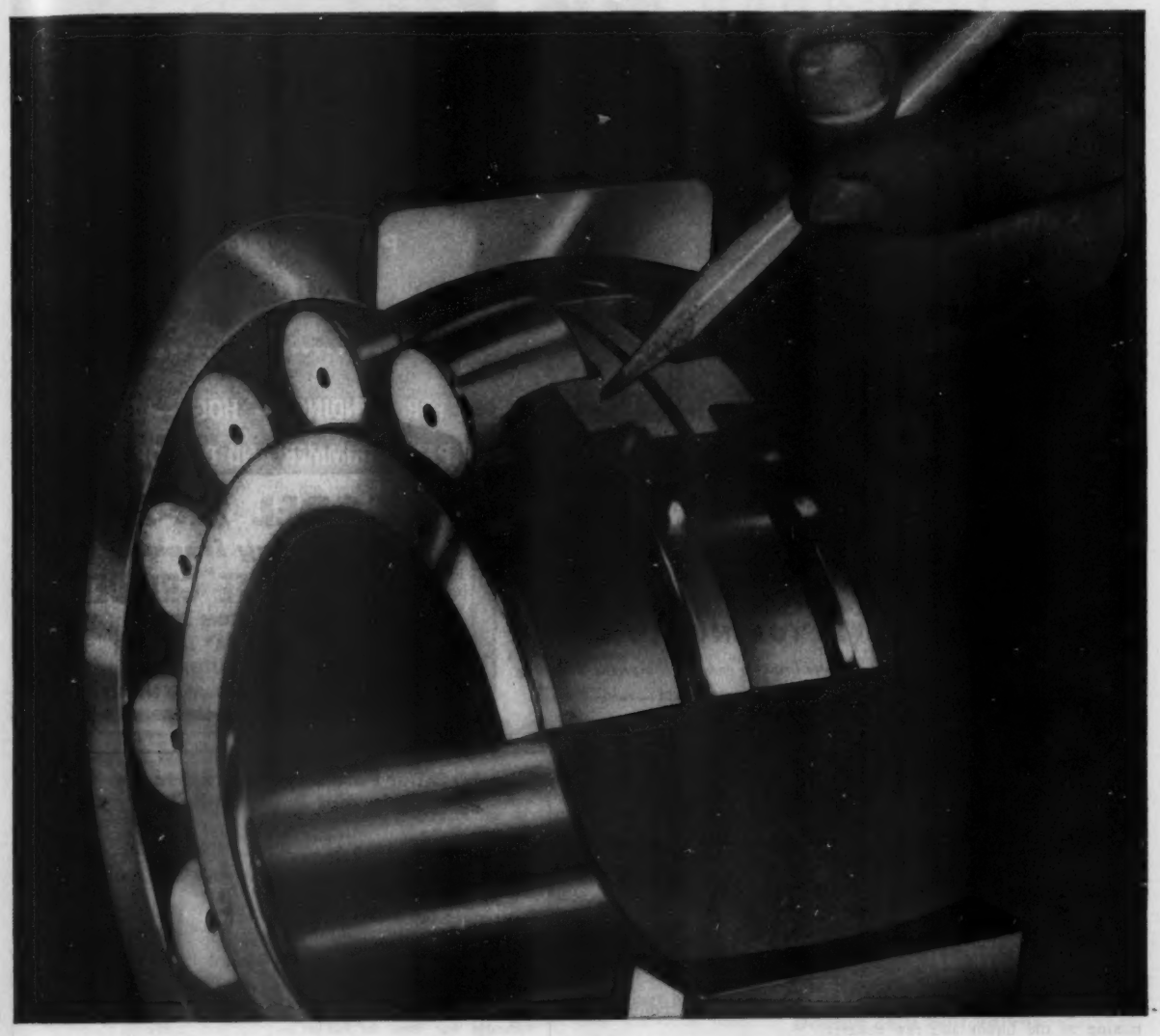

Land-riding cages for longer life!

These fully machined cast-bronze, land-riding cages—one for each path of rollers—are important performance builders in TORRINGTON'S Spherical Roller Bearings. The one-piece retainers keep the rollers perfectly aligned at all times, even under conditions of shock load and sustained speeds. Lubrication is more effective, too, as the lubricant has easy access to vital points of contact between rollers and races.

This feature is typical of TORRINGTON'S design, made possible through long experience in serving industry with the finest in precision bearings. That's why it pays to look to TORRINGTON first when your application calls for Spherical Roller Bearings. They're available from stock with either straight or tapered bore, for shaft or adapter mounting.

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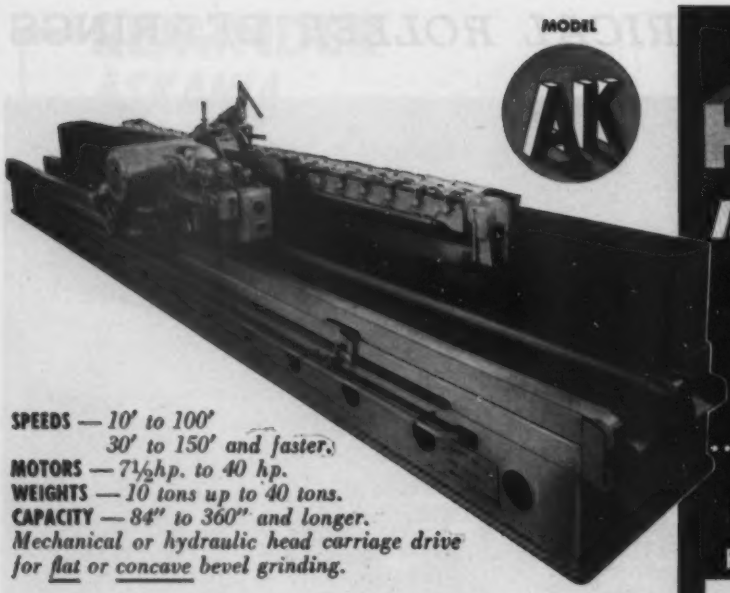
District offices and distributors in principal cities of United States and Canada

TORRINGTON BEARINGS
Spherical Roller • Tapered Roller • Cylindrical Roller
Needle • Ball • Needle Rollers



MODEL AK

SPEEDS — 10' to 100'
30' to 150' and faster.
MOTORS — 7½hp. to 40 hp.
WEIGHTS — 10 tons up to 40 tons.
CAPACITY — 84" to 360" and longer.
Mechanical or hydraulic head carriage drive
for flat or concave bevel grinding.

Other Models. (A) — medium heavy duty — capacity 32" to 184"
(B) — normal production — capacity 32" to 108"

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Patent Reviews . . .

is rotated. Steam is forced into the digester through steam pipes 15. Noncondensable gases are relieved when the steam pressure has reached about half that desired by closing off the steam supply and venting through the trunnion to atmosphere. Steam is then admitted again until the proper temperature and pressure have been attained.

During rotation of the digester, the rake 17 effects thorough mixing of the liquor and raw material.

It has been found that the pulp obtained is of equal or better quality than that which has heretofore been obtained with the use of 0.10 lb. of caustic soda per pound of rope, although only 0.06-0.08 lb. of caustic soda are in fact used. It has also been found that the resulting pulp is somewhat freer of shives, raw fiber and ligneous material.

Process of making and finishing coated paperboard

U.S. 2,790,730, issued April 30, 1957, to Stanley W. Trosset Jr. and assigned to Gardner Board & Carton Co., describes a method whereby the mineral-adhesive coating on webs of coated paper or paperboard can be consolidated, glossed and rendered more suitable for the application of gloss printing inks and for the reception of an all-over varnish coating.

Picking and sticking on finishing calender rolls is avoided while permitting softening of a mineral-adhesive coating, such as a protein adhesive, thus making it possible to obtain a true water finish. This is accomplished by applying to the surface of the coated web on a finishing calender stack, by means of water boxes, a solution of salt such as sodium chloride in a concentration of about 5-20 per cent.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Duplex take-off table for receiving and stacking sheets of fiberboard	S&S Corrugated Paper Machinery Co. Inc.	2,789,709	4/23/57
Sealed paperboard carton	Dairy Containers Inc.	2,789,745	"
Carton	Marathon Corp.	2,789,746	"
Carton with folding spout	Paul J. Graybill	7,789,747	"
Display lug box	Roswell P. Barbour	2,789,748	"
Cardboard dish	Charles R. Pearce	2,789,749	"
Hinged lid box	Gardner Board & Carton Co.	2,789,750	"
Breakfast food cartons	Samuel H. Feldman	2,789,751	"
Perforated tear sheet for cigarette packages	Fun-Del Inc.	2,789,752	"
Self-locking envelope	Herbert Zimmerman Sr.	2,789,753	"
Production of paper made with nylon scrap	Commonwealth Engineering. Co. of Ohio	2,789,935	"
Production of tanning agent from black liquor lignin	Svenska Cellulosaforeningens Centrallaboratorium	2,789,974	"
Production of phenolic products from lignin	Inventa A.G. fur Forschung und Patentverwertung Luzern	2,790,009	"
Carton for packaging and displaying articles	Swan Hillman	2,790,542	4/30/57
Combined display carton and easel assembly	New Haven Board & Carton Co.	2,790,543	"
Shipping containers	Owens-Illinois Glass Co.	2,790,588	"
Telescopic container	George A. Moore	2,790,589	"
Can carriers	New Haven Board & Carton Co.	2,790,590	"
Laminated bags and linings	Arkell Safety Bag Co.	2,790,592	"
Series-connected envelopes	Uarco Inc.	2,790,593	"
Coated paper products	Rohm & Haas Co.	2,790,735-6	"
Method of making cement bound asbestos paper	Victor Mfg. & Gasket Co.	2,791,159	5/ 7/57
Method of making valve bags	Crown Zellerbach Corp.	2,791,160	"
Mobile debarker for pulpwood	Eugene E. Krubsack	2,791,250	"
Dispensing carton	Continental Paper Co.	2,791,356	"
Partitioned shipping container	Patent & Licensing Corp.	2,791,362	"
Boxes	Paul F. Bonye	2,791,363	"

NEW PRODUCTS

Horizontal and vertical non-clog pumps

The photo above shows a horizontal Mono-Vane non-clog pump—type KGG. This pump is one in a series of horizontal and vertical non-clog pumps with the new Mono-Vane single-passage impeller which may be trimmed to various diameters at the factory or by the user to meet the requirements of other heads and capacities. Sizes range from 3-in. to 5-in., inclusive, suction and discharge diameters.

The manufacturer has stated that in handling long stringy solids these pumps are unsurpassed; some other applications are: handling of heavy settleable solids, effluent and other wastes; pumping sludge, etc.

A bulletin is offered by the company explaining the many features and other technical details of these pumps. *New York Air Brake Co.*

Circle No. 11 on Readers' Service Card

Industrial dehumidifier

Development of a new industrial dehumidifier suitable for low-humidity storage and processing applications has been announced.

Known as Dryomatic Model 105, it is an automatically regulated dual-tower unit which uses silica gel as its drying medium.

The unit is self-contained and may be installed either inside or outside the dehumidified area by providing a standard 115-v electric outlet and two small duct connections. *Dryomatic Corp.*

Circle No. 12 on Readers' Service Card

Combination multicolor flexographic press

A new machine known as the Kleina-Rotoplast is a combination multicolor flexographic press and bagmaker that is manufactured in Italy.

The Kleina press prints paper, cellophane, polyethylene and other flexible materials in two, three or four colors at speeds up to 325 fpm.

Three widths are available: 15¾ in., 17⅝ in. and 19⅝ in.; and a repeat range from 9½ in. to 31½ in. The press may be used for roll-to-roll operation as well as inline with the bagmaker. Optional equipment includes a reverse printing attachment for backprinting.

More technical information is available from the U. S. distributor for the Kleina-Rotoplast—*Parsons & Whittemore Graphic Corp.*

Circle No. 13 on Readers' Service Card

Combination pile inserter

The Hickok combination pile inserter has been improved to make it possible to automatically insert paper, blotters or board between any desired number of sheets of paper from a minimum of four up to 125 or more with equal ease and accuracy.

The changeover from handling the lightest Manila paper to chip board is quickly accomplished by the push of a button. No mechanical changes are necessary. *W. O. Hickok Mfg. Co.*

Circle No. 14 on Readers' Service Card

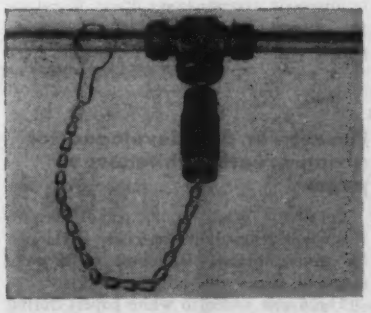
Baromatic syphon system

A Baromatic syphon system has been developed for automatic water extraction and control of vacuum at the flat suction boxes of the fourdrinier machine. It is also applied to savealls, filters, etc.

The unit is a successor to the widely-used Poirier Master Syphon System and is used on all grades from tissue and bible through to kraft liner boards.

The company has stated that this system permits increased production and operating speeds; provides superior formation, longer wire life, power savings to 70 per cent, dryer savings and numerous other benefits. The company invites your requsets for further technical information concerning the system. *Poirier Control Co.*

Circle No. 15 on Readers' Service Card



Danger signal bull plug

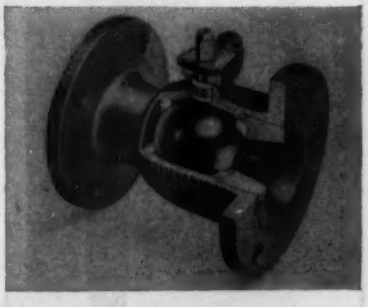
Pictured above is a free-hanging danger signal bull plug that can quickly pin-point the location of a dangerous opening in piping lines. When these plugs are used, they are easily seen and give immediate warning that unsafe conditions or fire hazards exist.

As you can see in the illustration, the plugs cannot get lost, misplaced or carried away from the job since each plug features a permanently attached chain and ring at the unthreaded end.

More information is available from *Crawford Fitting Co.*

Circle No. 16 on Readers' Service Card

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.



Double seal ball valves

Announcement has been made that the Jamesbury Corp. has added 3-in. and 4-in. double seal ball valves to its line.

These valves feature full-flow and quarter-turn operation and are made in aluminum, bronze, 316 stainless steel and carbon steel. Seat and seals are available in Buna-N, Neoprene, Teflon and synthetic rubbers. Remote-controlled operators can be supplied for these valves. Complete data are available from *Jamesbury Corp.*

Circle No. 17 on Readers' Service Card

Counterflow consistency and basis weight regulator

A new concept in consistency and basis weight regulation has been developed by Poirier Control Co. The unit operates with no moving parts or conventional-type dilution apparatus.

The company has stated that the unit is guaranteed to control consistency to with-

LODDING
NON-CLOGGING SHOWER

Here is a shower that you can use on white-water.
Ask your Lodding man for a demonstration.

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in 1/10th of 1 per cent; basis weight to within 2 per cent plus or minus. It is successfully applied to all grades from 8-lb. tissue to 270-lb. kraft liner boards.

More information on this unit is available from *Poirier Control Co.*

Circle No. 18 on Readers' Service Card

Shaft-mounted drives with new higher ratio units

A new higher ratio of 24:1 (or 20:1 in two smaller sizes) has been added to the line of all-steel, double reduction, shaft mounted drives manufactured by Falk Corp. The outside dimensions and torque rating remain the same.

The units are available for horizontal and vertical application. A copy of the new selection tables can be obtained from *Falk Corp.*

Circle No. 19 on Readers' Service Card

Aluminum formate powder

Announcement has been made that aluminum formate is now available in powder form. It is more concentrated than conventional solutions and therefore lowers freight, storage and handling costs. The company states that it gives greater flexibility in making up more concentrated solutions and is compatible with paraffin emulsions and other sizes. *Aceto Chemical Co. Inc.*

Circle No. 20 on Readers' Service Card

Self-operating temperature regulators

A new line of single-seated temperature regulators for automatic flow regulation of liquids or steam, these self-operating regulators are of two types—direct acting and reverse acting.

Both types are easily adjusted for temperature control within a 40° F operating range within 100° F and 240° F. They feature overheating protection and rugged bronze-body construction. *Watts Regulator Co.*

Circle No. 21 on Readers' Service Card

Fluorescent dye developed for giving greater whiteness to paper

Calcofluor White is the name given to a newly-developed dye specially developed for giving greater whiteness to a wide range of paper and allied products.

The dye is added to white papers during the papermaking process or as part of a surface coating. The effect of the dye is to absorb invisible light rays striking the sheet and to release these rays as visible blue light. This cancels any yellow cast that the paper may have and results in a whiter, brighter sheet.

Further information on technical facts is obtainable from *American Cyanamid Co.*

Circle No. 22 on Readers' Service Card

Centrifugal pumps

A new series of end suction general purpose centrifugal pumps is now being produced for the market. Sizes range from 1/6 hp to 7½ hp at 3,500, 1,750 (60 cycle) and 2,880, 1,440 (50 cycle) speeds—ac or dc—all voltages and phases.

Circulation of liquids in air conditioning, refrigeration, coolant, hot water, chemical and general purpose applications are among the applications. Special alloys to meet specific conditions are available. *New York Air Brake Co.*

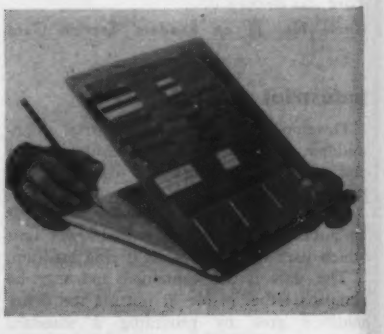
Circle No. 23 on Readers' Service Card

Drive units

The addition of two new sizes to the line of Reeves Vari-Speed Motodrives is announced.

Improved design for the variable speed internals permits wider ratio of speed variation and more speed ranges. Reducer capacity, single, double or triple stages, has been increased. The new drive sizes are for 1-hp through 5-hp applications. Automatic controls and other accessories are available with these units. *Reliance Electric & Eng. Co.*

Circle No. 24 on Readers' Service Card



Sheet holder

Here is an item that can be helpful to foresters, field superintendents, traffic men and chemists. It is a sheet holder with a carrying pouch. This pouch is designed to hold pencils, rulers or other possible tools that must be carried. *Stratex-Instrument Co. Inc.*

Circle No. 25 on Readers' Service Card

Draw speed and linear speed gauges

Two new instruments for measuring draw speeds and linear speeds have been developed. The company states that the draw speed gauge measures with extreme

"WATER CONDITIONED" . . .

ANOTHER REASON . . .

You can't beat HAMILTON Felts

"*Fisherman's* luck" can help
—even a beginner—bring in an occasional
speckeled beauty . . . But you can
depend upon an experienced fisherman—
wise in the ways of a fly with a trout—
to bring home the most fish—consistently!

So why trust to "fisherman's luck"
in fishing—or in ordering felts?

Since 1858, Hamilton Felts have been "*water conditioned*"
—*not* to shed water like a fish—but
to run water like a sieve,
deliver drier sheets to the driers, permit
operators to operate machines at higher speeds—
with fewer stops and less broke.
Isn't this the *professional* performance you'd
like felts to give? Then, why not
contact us—today?

YOU CAN'T BEAT
Hamilton
FELTS

HAM FELTZ says:

"Good health is priceless—
even a rich man can't afford
an accident."

Contributed by R. T., Cleveland.

Have you a pet safety slogan? Send it to Ham Feltz.
We like "floods"—of mail.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

accuracy the draw or extension of paper between rolls and can operate with a continuous recorder to provide a permanent record of the draw.

The linear speed gauge gives exceptional accuracy by a suppressed zero system, which presents a limited speed range full scale on meter or recorder. The company invites your request for more detailed and technical information. *Curtiss-Wright Corp.*

Circle No. 26 on Readers' Service Card

Hour meter

Here is a direct-reading meter used to log total hours of machine or equipment operation. The square-face meter is particularly suitable for panel mounting.

The meter is available in 120V, 240V and 480V in 50 or 60 cycle. This meter is fully described in the company's new catalog, which is free on request to *John W. Hobbs Corp.*

Circle No. 27 on Readers' Service Card

Grey paint developed for color-testing

A completely neutral grey paint for use in printing plants and experimental laboratories where color tests are being conducted has been developed. The new paint is called Graphic Arts China-Lux Grey.

When measured spectrophotometrically, surfaces finished with the new paint show virtually linear response to all wave lengths in the visible spectrum. For this reason distortion of a color under observation is held to an absolute minimum. The over-all reflectance has been established at approximately 60 per cent. *Sun Chemical Corp.*

Circle No. 28 on Readers' Service Card

Safety valves

A series of bronze pop safety valves has been developed for steam generator service and air or gas applications at set pressures up to 300 lbs. at 450° F. Sizes range from ½-in. to 3-in., male, female side outlet. Flanged inlets on application.

Complete size and capacity data are available on request from *Farris Eng. Corp.*

Circle No. 29 on Readers' Service Card

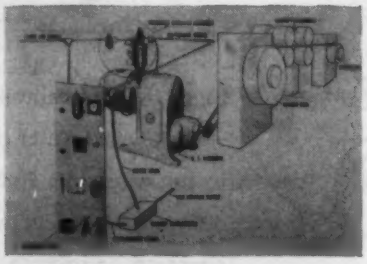
Corrosion-proof lined pipe with fittings

Announcement has been made of the development of a corrosion-proof lined pipe with fittings.

The pipe is lined with a patented high-density Teflon compound called Fluoroflex-T1001, which is chemically inert at temperatures up to 500°F except for molten alkali metals and fluorine at elevated temperatures and pressures.

Further information regarding sizes available and other construction details is available from *Resistoflex Corp.*

Circle No. 30 on Readers' Service Card



Rewind tension control

The diagram shows a new automatic rewind tension control system that supplies the need for variable speed by precisely reducing the speed of the U. S. Varidrive as the rewind roll diameter builds up. All technical information about this new system can be supplied by the manufacturer. *U. S. Electrical Motors Inc.*

Circle No. 31 on Readers' Service Card

Air-powered stretcher for tensioning heavy-duty strapping

This sturdy, compact, light-weight tool lets air power do the hard work of tensioning strapping on crates, skids, coil stock and freight car bracing. It speeds strapping operations by doing away with slow tensioning by hand.

The air pressure may easily be set to give just the right amount of tension for any strapping operation. *Signode Steel Strapping Co.*

Circle No. 32 on Readers' Service Card

Gum breaker machine

A manufacturer has stated that improvements in the design of a new gum breaker machine recently put into operation have

WILLIAMS-GRAY COMPANY

221 North LaSalle Street, Chicago 7, Illinois

Paul Foster • Peter Talbot • Ross Lawrence

Herb Fishburn • Wes Gallup • Bill French

Lindsay & Niagara Wires, Knox Woolen Felts Cotton & Asbestos Dryer Felts, Carrier Rope Splicing Tissues, Deckle Webbing, Apron Cloth, Wire Brushes.

Sulphite Mill Acid Plants
Semichemical Liquor Plants

Sulphur Burning Plants • Jenssen Two Tower Acid Systems • Gas Coolers—Surface and Spray Type • Jenssen Pressure Acid Systems • Jenssen Auxiliary Process Towers • Recovery Plants—Cooking Acid

SOLUBLE BASE ACID PLANTS
JENSSEN SO_2 ABSORPTION SYSTEMS

For Bleach Plant Application—Sulphurous Acid Preparation
COMPLETE DESIGN AND INSTALLATION

G. D. JENSSEN CO., INC.
MASSENA, NEW YORK

WESTERN REPRESENTATIVE:
JAMES BRINKLEY COMPANY, Seattle, Washington

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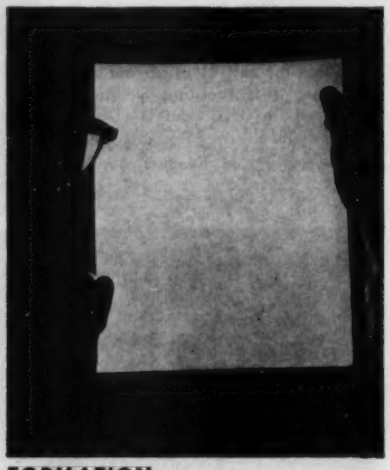

FORMATION

TENSILE

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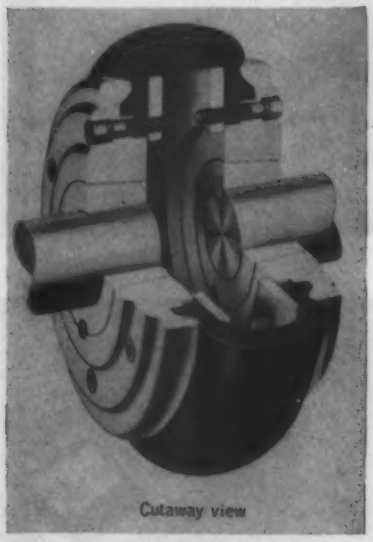
resulted in greatly increased speed and a minimum of maintenance when compared to existing gum breakers of older design.

One machine that is now installed and printing gummed paper such as stamp and label stock for web widths to 52 in. is running at 2100 fpm.

An outstanding feature of this machine is the open construction, which makes it accessible for easy cleaning and threading. It is stated that threading operation can be performed in less than 15 sec. *Black-Clawson Co.*

Circle No. 33 on Readers' Service Card



Cutaway view

Flexible couplings

Para-flex is stated by the company as a wholly new conception in flexible couplings and is the latest addition to the company's line of power transmission machinery.

As shown in the photo, the heart of the Paraflex coupling is a tire with synthetic tension members bonded together in rubber. Because there is no metal-to-metal contact in the coupling, it requires no lubrication.

These couplings will be stocked in popular transmission sizes. They are available from factory stock in capacities up to 600 hp at 900 rpm. The manufacturer of the coupling is *Dodge Mfg. Corp.*

Circle No. 34 on Readers' Service Card

Transistorized digital control computer

A manufacturer has disclosed that a unit called the RW-300 computer will provide fully automatic control for industrial process plants. The unit was specifically designed to automatically control a wide variety of manufacturing processes such as paper manufacturing, chemical manufacturing, etc.

The RW-300 measures only 55 in. in length by 29 in. in width, and it is 36 in. high. It weighs approximately 400 lbs.

The company welcomes your request for further information on the unit. *Ramo-Wooldridge Corp.*

Circle No. 35 on Readers' Service Card

Reducing valves for steam service

In Fisher Governor's line of reducing valves, a new version called Type 92B is a completely self-operated unit, obtaining pilot operating medium directly from the inlet. This feature makes the new unit desirable for applications where air or gas as an operating medium is not available, or where its use is not practical.

The company welcomes your request for further information concerning this valve. *Fisher Governor Co.*

Circle No. 36 on Readers' Service Card

Indicating instrument for liquid density measurement

A precision-built instrument that provides direct, easy-to-read indication of liquid density of a continuously-flowing process liquid has been developed. The instrument has a zero-set adjustment for original calibration under working conditions, as well as a temperature adjustment that permits setting to existing fluid temperatures to provide a temperature-corrected specific gravity reading.

Other specifications are obtainable from *Precision Thermometer & Instrument Co.*

Circle No. 37 on Readers' Service Card

High-speed moisture analyzer

The instrument pictured is the new NMR high-speed moisture analyzer—Model 104. The instrument makes quantitative determinations of moisture content in a wide variety of solids, such as wood pulp, syrups, cotton, cereals etc. The company states that it will carry out this analysis in from 30 sec. to 4 min. The manufacturer is *Schlumberger Well Surveying Corp.*

Circle No. 38 on Readers' Service Card

New-type paint gun

The cut-away illustration above shows the interior of a new-type paint gun that

another new

AIRLOADED HEADBOX

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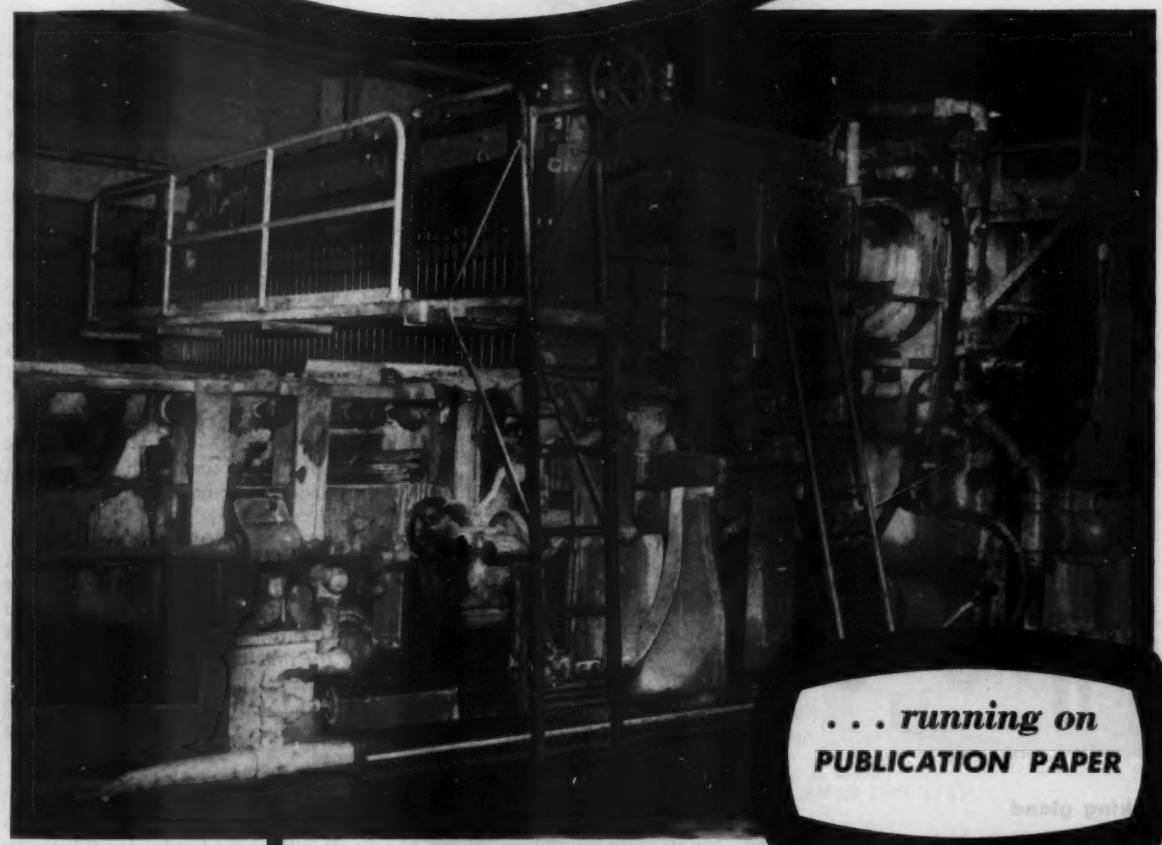

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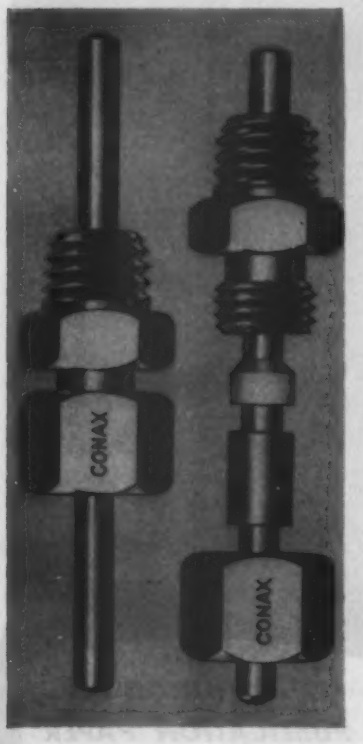
New Products . . .

slings paint rather than propels it to the surface with air like the conventional air spray guns. This centrifugal-action gun thus avoids overspray and fogging that limits the use of other guns to the wide open spaces.

Complete information on construction, performance and other details is available from the manufacturer. *Napco Inc.*

Circle No. 39 on Readers' Service Card



Packing gland

This new packing gland may be used to seal tubes of any material because the soft sealant makes it indifferent to tube composition. Ceramic, stainless steel, aluminum, brass or even glass tubes may be sealed in the packing glands. Increased fatigue strength and resistance to vibration is assured by the reduction of stress concentration at the point of seal.

More information concerning the size and construction of these packing glands is available. *Conax Corp.*

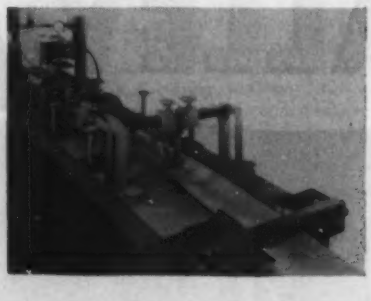
Circle No. 40 on Readers' Service Card

Proportioning temperature controller

A new device, Ectrotherm Model T-157, utilizes a resistance type sensing unit that permits the temperatures of industrial processes to be precisely controlled. These temperatures are correctly maintained through measuring the medium being heated and modulating the power to the heater so that the average power input is equal to the heat loss.

The unit is cycled off and on in response to the slightest temperature changes, this sensitivity being responsible for immediate and accurate heat control. *Electronic Processes Corp. of California.*

Circle No. 41 on Readers' Service Card



Continuous tube folder-gluer or folder-taper

This machine is particularly adaptable to run the long, narrow panel, hard-to-fold tubes and pulls continuously from a fan-fold pile of many lineal feet. The machine is adjustable for different panel sizes—the minimum being 1 in. × 1 in. Taper or gluer can be added in either case, respectively, if either gluing or taping may be additionally required. Customer can add a cut-off means to cut to required lengths. *General Corrugated Machinery Co.*

Circle No. 42 on Readers' Service Card

Trucks for use in narrow aisles

The company's line of riding-type electric tiering trucks is now available with a HydraFork attachment to further facilitate use of the trucks in extremely narrow aisles.

To pick up a palletized load from the floor or a storage rack, the operator of the HydraFork truck simply hydraulically extends the forks into the pallet. Next, the load is lifted over the load wheels and the forks and load are retracted into the truck. *Lewis-Shepard Products Inc.*

Circle No. 43 on Readers' Service Card

All-plastic check valve

A new PVC check valve is said to operate successfully at pressures up to 150 psi at 75° F. The construction of the valve is of normal-impact rigid polyvinyl chloride to provide high corrosion resistance to alkalis, acids, inorganic salt solutions and other corrosive flow material. A highly durable PVC spring positions the disc to assure quick and complete shutoff.

The manufacturer of this valve is *Walworth Co.*

Circle No. 44 on Readers' Service Card

Acrylic Resins

(Continued from page 493)

with high-tack multicolor inks without picking. These coatings have unusually good printing characteristics in letterpress, offset and rotogravure printing processes. In addition, as illustrated in Fig. 7, the ink receptivity and varnish hold-out of acrylic coatings improve as the level of acrylic binder is increased.

The optimum print quality is obtained when the coating contains a sufficient quantity of starch or protein to overcome pattern but not enough to detract from the final printing characteristics. The optimum blend is usually about 90 parts of Rhoplex emulsion combined with 10 parts of water-soluble binder.

Odor characteristics

The odor of Rhoplex B-15 and Rhoplex B-60A, as received, is due to the trace of volatile monomer in the emulsions and quickly dissipates by the time the coating is dry. Because it possesses no odor when fully dried, acrylic-coated paper has been used to wrap tobacco and foodstuffs such as bread.

Brightness

The brightness of clay coatings is reduced as the binder level increases with any type of binder. As shown in Fig. 8, the reduction in brightness is somewhat less with an acrylic binder than with casein as the binder level is increased.

Water resistance

Acrylic coatings applied on the paper machine sometimes do not attain sufficient resistance to water to permit water-finish at the calendar stack. To eliminate washing at the stack, zinc sulfate or alum may be used at solution concentrations of 1 to 2 per cent. In applications involving unusually heavy coating weights, an increase in the normal binder level will improve water resistance. Once dried, acrylic coatings have excellent water resistance.

NEW LITERATURE

Books

TECHNIQUES OF PLANT MAINTENANCE & ENGINEERING—1957. Published by Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y. $10.00. 273 pages.

Each year plant engineers and maintenance managers meet to exchange experience at the National Plant Maintenance and Engineering Conference, held in conjunction with the National Plant Maintenance and Engineering Show. This book is a record of those discussions. It includes both the prepared papers and the informal extemporaneous question-and-answer sessions that followed them.

This volume is the eighth in the series that began with first conference in 1950.

LABORATORY GLASSBLOWING. By L. M. Parr and C. A. Hendley. Published by Chemical Publishing Co. Inc., 212 Fifth Ave., New York 10, N. Y. $4.00. 154 pages.

This book is a practical guide to the fundamental processes of laboratory glassblowing.

The chapters detail the actual glassblowing techniques from the elementary operations such as cutting, joining, sealing, etc., to the more advance processes for blowing special-purpose laboratory glassware.

The instructions and illustrations given will enable any reasonably dexterous person not only to repair broken glassware but also to make quite complicated glass apparatus.

CONVEYOR TERMS AND DEFINITIONS. Published by Conveyor Equipment Manufacturers Association. One Thomas Circle, Washington 5, D. C. $1.00.

The need, growing over the years, for uniform terms and definitions for the many and varied types of conveyors has prompted the Technical Committee of the Conveyor Equipment Manufacturers Association to compose this booklet in the attempt to make these terms unanimous for all who are concerned with the conveyor industry.

Booklets and Pamphlets

A MARKETING INFORMATION PRIMER FOR WOODLOT OWNERS. This is the title of an article written by Harry S. Mosebrook of the American Pulpwood Association. The article gives suggestions which will enable the woodlot owner to more easily bridge the gap between growing his forest and selling its various products to best financial advantage. A reprint copy of this article is available from: American Forestry Association, Washington, D. C.

USDA Reports

LIST OF PUBLICATIONS. This is a 16-page booklet listing the publications available from the Forest Products Laboratory. The listing consists of publications published by the laboratory from July 1 through December 31, 1956. This booklet and all publications listed in the booklet will be sent free of charge by writing to: Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, Madison 5, Wis.

SILVICAL CHARACTERISTICS OF RED PINE. This report is one of the series being prepared by the Lake States Station covering the information concerning the silvical characteristics of different species. This particular report deals with the red pine species. It is a 30-page booklet prepared by Paul O. Rudolf. Copies are available from: Lake States Forest Experiment Station, St. Paul 1, Minn. Ask for Station Paper No. 44.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Motor starter and contactor

Allis-Chalmers Mfg. Co. describes its complete line of motor starters and contactors in sizes 4, 5 and 6 (Type 425), 50 to 400 hp. in a new 12-page bulletin.

Circle No. 45 on Readers' Service Card

Solving roof problems

Tramco Mfg. Co. has published a 16-page brochure titled "Solving Roof Problems". The

Now available in book form

Technology of Paper Coating

by H. Witcoff
Director of Chemical Research, General Mills Inc.

and A. W. J. Dyck
Editorial Director, The PAPER INDUSTRY

The latest developments in the technology of paper coating are brought to the reader clearly and concisely in this new book that is based with some revision on a series of articles appearing in The PAPER INDUSTRY from May 1956 through May 1957.

The up-to-the-minute techniques in general use are described in detail. Various specific methods of on-the-machine and off-the-machine coating processes are described and illustrated. Of major importance is the discussion of properties and uses of new as well as established organic and inorganic coatings in wide and specialized usage. A number of typical formulations are shown.

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Contents and Contributors:

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PAPERMAKING MATERIALS AND PROCESSES —John B. Calkin
VARIETIES OF PAPER AND PAPERBOARD —Ralph W. Kumler
THE WOOD ROOM—W. A. McKenzie
THE SULFITE PROCESS—John L. Parsons
THE ALKALINE PROCESSES—A.G. Durgin
SEMICHEMICAL PULPING —A.G. Durgin, Thaxter W. Small, Jr.
MECHANICAL PULP—THE GROUNDWOOD MILL —J.H. White
PULP BLEACHING—John L. Parsons
STOCK PREPARATION—Ralph W. Kumler
THE MACHINE ROOM —John B. Calkin, John L. Parsons
THE FINISHING ROOM—Arthur R. Perrin, Jr.
PAPER DEFECTS—Noel R. Phillips
GENERAL DESIGN OF PULP AND PAPER PLANTS—D.G. Moon
TESTING OF PAPER AND PAPER MATERIALS —William Landes
PROCESS INSTRUMENTATION FOR THE PULP AND PAPER INDUSTRY—John H. Heuer, Henry S. Drinker, Robert B. Wolf, and John R. Lavigne
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brochure is illustrated and thoroughly explores such subjects as the various types of roofs, how they are built, what factors enter into their deterioration and how roof troubles can be diagnosed and treated.

Circle No. 46 on Readers' Service Card

Laboratory instruction manual

Valley Iron Works Co. has announced a new revised instruction manual for installation, operation, care and maintenance of Valley Laboratory equipment, including Niagara 1-½# Beater with grinding-in instructions. This manual is available to all users of Valley laboratory equipment upon request.

Circle No. 47 on Readers' Service Card

Equipment for oxygen analysis and recording for rotary kilns

Leeds & Northrup Co. gives complete information about the company's equipment for oxygen analysis and recording for rotary kilns in a 4-page data sheet just published. All details of the system and its installation are given along with the listing of ordering instructions and specifications.

Circle No. 48 on Readers' Service Card

Polyethylene glycols

Olin Mathieson Chemical Corp. is issuing a revised technical data bulletin on the company's polyethylene glycols. The bulletin gives physical properties, specifications and the uses of the products.

Circle No. 49 on Readers' Service Card

Gum arabic—its uses and properties

Morningstar, Nicol Inc. has printed laboratory reports which contain informative data on the preparation of clear solutions from various types of gum arabic.

Circle No. 50 on Readers' Service Card

Valves

Farris Flexible Valve Corp. is offering a 48-page catalog detailing its line of flexible, pinch-type, hose-bodied valves in both standard and new SuperSeal metal-enclosed designs. Other information on installation and maintenance instructions is also given.

Circle No. 51 on Readers' Service Card

Rotameters

Brooks Rotameter Co. utilizes a novel and convenient means for aiding prospective users of the company's flow meters in the selection of the appropriate meter for a specific application.

Circle No. 52 on Readers' Service Card

Outdoor fork truck

Clark Equipment Co. has described in detail the features, specifications and operating characteristics of the outdoor fork truck in a brochure. The model is called the YR-6024 and is a 6000-lb. capacity fork truck.

Circle No. 53 on Readers' Service Card

Bulletin on pH electrodes

Beckman Instruments Inc. has published an 8-page bulletin featuring the company's pH electrodes for laboratory and portable pH meters. It is made up in a simplified chart-form, completely indexed and illustrated.

Circle No. 54 on Readers' Service Card

Technical information on the subject of stock agitation

Black-Clawson Co. has printed a booklet of 16 pages of technical information on the subject of stock agitation. The information given is well-illustrated with photos and line drawings to give a better understanding. Products which are manufactured by the company are given in the last part of the booklet.

Circle No. 55 on Readers' Service Card

Steam specialties

Strong, Carlisle & Hammond has just released a new catalog of its entire line. The catalog gives complete details on all phases, such as order, installation, full descriptions of each product and also prices of replacement parts for all equipment in the line.

Circle No. 56 on Readers' Service Card

Oil coolers

Schutte & Koerting Co. just published a bulletin on its Type "BD" oil coolers. The bulletin includes data on design and operating features, material specifications, sizes and dimensions, plus a handy sizing system.

Circle No. 57 on Readers' Service Card

Static switching systems

General Electric Co. provides revised, up-to-date information on the company's new static

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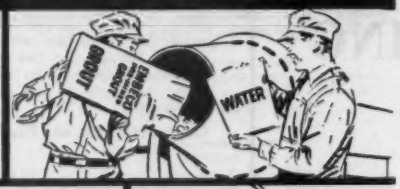

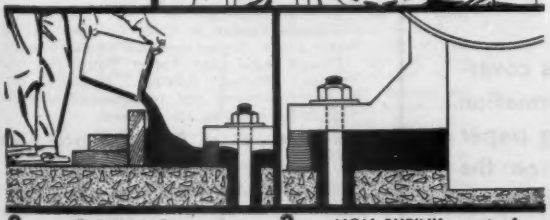

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New Literature . . .

switching system in an 8-page booklet. It explains operation of units and how the unit combinations are wedded to make up the integrated system.

Circle No. 58 on Readers' Service Card

Brass valves with quick-change disc

Crane Co. has published a new folder on brass composition-disc globe, angle and lift check valves. The folder emphasizes the advantages of the brass valve for a broad range of services along with other major design features of the valves.

Circle No. 59 on Readers' Service Card

Air compressor

Ingersoll-Rand Co. has announced a new air compressor to be known as the "Channel-Flo" in a brochure. This compressor is a two-stage, 200-psig rated motorcompressor presently available in 1½ and 2 horsepower sizes.

Circle No. 60 on Readers' Service Card

Slitter-rewinders

Black-Clawson Co. Inc. has printed a booklet which contains short, thumbnail descriptions of the most modern slitter-rewinders now offered by the company. A photo and a diagrammatical drawing is shown for each type.

Circle No. 61 on Readers' Service Card

Controlled-volume pumps

Milton Roy Co. has recently published a bulletin describing its complete line of motor-driven controlled-volume pumps. The bulletin contains complete specifications and latest design features of these pumps. The different models offered and their applications are also given.

Circle No. 62 on Readers' Service Card

Diaphragm motor valves

Fisher Governor Co. is issuing a 40-page booklet describing the company's line of diaphragm motor valves. Several pages are devoted to each type of valve, giving the complete details of construction and use.

Circle No. 63 on Readers' Service Card

Slime control agent

National Aluminate Corp. is offering a data sheet on a new chlorinated phenolic-type slime control agent. The product is used for general microbiological control in pulp and paper mills an in recirculating cooling water systems. The product is called Nalco 201.

Circle No. 64 on Readers' Service Card

Paper expansimeter

Martin Sweets Co. is inviting your requests for complete technical information on the company's Neenah multiple specimen paper expansimeter for measuring hygroexpansivity and hydroexpansivity.

Circle No. 65 on Readers' Service Card

Gearmotors and package drives

Westinghouse Electric Corp. has made available a new 8-page booklet on gearmotors and package drives. Horizontal, vertical, right angle, open, enclosed, explosion-proof, ac and dc units are all illustrated with their respective reduction ratios and output speeds.

Circle No. 66 on Readers' Service Card

Standardized motor control center

Cutler-Hammer Inc. describes Unitrol, the standardized motor control center, in a recent publication. The 32 pages in the booklet feature Unitrol's new concept of modular design, which presents a wide variety of motor control in a central structure. The company invites your requests for this booklet.

Circle No. 67 on Readers' Service Card

Fabric used with filtration equipment

Filtration Engineers Inc. has developed a filter fabric made of napped spun Orlon which is recommended for use with either wet or dry filtration equipment. The company has a flyer describing the fabric, its features and characteristics. A sample of the cloth is also attached to the flyer.

Circle No. 68 on Readers' Service Card

Plastic pipe and fittings

Triangle Conduit & Cable Co. Inc. has released a new 16-page technical catalog entitled, "Triangle Rigid High Impact Plastic Pipe and Fittings." Photos, drawings, dimension data charts, descriptions and recommended uses for each fitting and pipe are described.

Circle No. 69 on Readers' Service Card

Hose and duct products

Flexaust Co. gives prices and complete information on the Flexaust hose and Portovent duct products in a new bulletin. There is also a section devoted to the accessories which are available for both the hose and the duct products.

Circle No. 70 on Readers' Service Card

Production calculator

Albany Felt Co. has developed a new production calculator specifically designed for newsprint machines. The calculator is in the form of a slide rule. It will compute production tons in a 24-hr. period based on fpm, basis weight and inches trim, production at a stated efficiency and efficiency of production. The calculator may be obtained free of charge.

Circle No. 71 on Readers' Service Card

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MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.	
No. 1 white shirt cuttings	13.00—	13.50
Soft unbleached muslins	15.50—	16.00
Fancy shirt cuttings	4.50—	5.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.50
No. 1 light silesias	6.50—	7.00
No. 1 light prints	4.75—	5.00
Light flannelettes	6.50—	7.00
Cottonades	2.75—	3.25
Blue overall cuttings	6.75—	7.25
Blue cheviots	6.75—	7.25
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.00—	5.50
American linen cuttings	6.75—	7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.	
No. 1 roofing (Chicago)	.60—	.65
No. 2 roofing (Chicago)	.40—	.45
Twos and blues, repacked	1.50—	1.75
Thirds and blues, repacked	1.50—	1.75
No. 1 whites, repacked	—	
No. 1 whites, miscellaneous	—	
No. 2 whites, repacked	—	
No. 2 whites, miscellaneous	—	

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shapperies	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	4.75—	5.00
Gunny No. 1, foreign	4.50—	5.00
No. 1 manila rope, domestic	7.75—	8.25
No. 1 manila rope, foreign	6.25—	6.50
New burlap cuts (soft)	6.00—	6.50
Sisal strings	—	
Mixed strings	—	

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	105.00—115.00
No. 1 hard white shavings	85.00— 90.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	55.00— 65.00
Fly leaf shavings No. 1	25.00— 30.00
Fly leaf, woody, No. 1	25.00— 30.00
Mixed colored shavings	18.00— 20.00
No. 1 books and magazines	17.00— 18.00
Ledger stock, white, No. 1 (carloads)	45.00— 50.00
Ledger stock, colored, No. 1 (Midwest ship)	25.00—
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	50.00— 60.00
Colored tab cards	40.00— 50.00
New northern kraft envelope cuttings	60.00— 65.00
Triple sorted kraft, 100%	25.00— 30.00
No. 1 old kraft	25.00—
White news cuts, No. 1	50.00— 55.00
No. 1 overissue news	14.00— 16.00
Folded news, special	15.00— 16.00
Folded news, ordinary	12.00— 14.00
Old corrugated boxes	23.00— 24.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	6.00— 7.00
No. 1 mixed paper	2.00— 5.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt	5.05—
Powdered, drums, works, cwt	5.20—
1-Arginine, drums, kilo	74.80—
Blanc Fixe	
Direct process, bags, c.l., works, ton	110.00—
L. c. l., ton	120.00—
Bleaching Powder, drums, cwt	
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb	.56
80-mesh bags, 10,000-lb. lots or more, shipping point, lb	.64
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh, bags, c. l., Georgia works, ton	10.00—
300-mesh, bags, c. l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— 35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt	3.15—
Glycerine, refined (CP, USP) 99%, drums, c. l., delivered lb.	.29½—
Litharge, commercial powdered	
Barrels, c. l., works, freight equalled, lb.	.16—
Rosin, gum, c. l., f.o.b. New York, cwt	
E	—
F	—
G	8.75—
WW	9.40—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	7.60—
N	7.70—
WG	8.15—
WW	8.40—
Saltcake, domestic, bulk Works, 100% Na2SO4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c. l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt.	4.70—
Solid, 76%, drums, c. l. works, cwt.	4.30—
Sodium Silicate	
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	26.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09¼—
High-tinting, drums, c. l., lb.	.09 —
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l., freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	150.00—
Bleached sulfite, Canadian	150.00—
Unbleached sulfite	130.00—
Unbleached sulfite, Canadian	130.00—
Bleached soda	145.00—
Bleached soda, Canadian	145.00—
Kraft, bleached hardwood	150.00—
Kraft, bleached	152.00—155.00
Kraft, bleached southern	155.00—
Kraft, bleached Canadian	155.00—
Kraft, unbleached southern	117.50—122.50
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	130.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	72.50—
Sulfate screenings	67.50—
Groundwood, dom.	82.50— 90.00

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	150.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	150.00—
Bleached sulfite, Finish, freight allowed	150.00—
Unbleached sulfite, Swedish, freight allowed	130.00—
Unbleached sulfite, Finnish, freight allowed	130.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	155.00—
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50
Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90
Rag Content Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials
Tissues (carlots)	per ream
White No. 1	
White No. 2	
Bleached anti-tarnish	
Colored	
Anti-tarnish kraft	
Manila	
Napkins, semi-crepe (12½ lb. to M shts) per case	
Napkins, full crepe and embossed (12½ lb. to M shts) per case	
Toilet, bleached (M shts) per case	
Toilet, unbleached (M shts) per case	
Wrappings (kraft, basis 50 lb. and heavier)	per cwt
Standard wrapping	9.50
Butchers, counter rolls	10.50
Standard bagging, mill rolls	
Shipping sack, mill rolls	
Gumming, mill rolls	
Asphalting, mill rolls	
Envelope, mill rolls	

Safety News . . .
(Continued from page 526)

mill, Castleton-on-Hudson, N. Y.; Certain-Teed Products Corp., York, Pa.; Celotex Corp., Los Angeles; Coos Bay Pulp Corp., Empire, Ore.; Container Corp. of America, Chattanooga, Tenn.; Certain-Teed Products Corp., Richmond, Cal.; Flintkote Co., Lockport, N. Y.; Certain-Teed Products Corp., Niagara Falls, N. Y.

Group E

Mead Corp., Nashville, Tenn.; Spaulding Fibre Co. Inc., North Rochester, N. H.; Celotex Corp., Metuchen, N. J.; United States Gypsum Co., North Kansas City, Mo.; National Gypsum Co., Kalamazoo, Mich.; United States Gypsum Co., Galena Park, Texas; Bestwall Gypsum Co., Pryor, Okla.; Celotex Corp., Cleveland; Fibreboard Paper Products Corp., board mill, Sumner, Wash.; Canadian Johns-Manville Co. Ltd., Asbestos, Que.

St. Regis Paper Co. (Muskingum Fiber Products Co. Div.), Coshocton, Ohio; Flintkote Co., Little Ferry, N. J.; National Gypsum Co., Pryor, Okla.; United States Gypsum Co., Oakfield, N. Y.; Riegel Paper Corp., Riegelsville, N. J.; American Writing Paper Corp. (Albion Div.), Holyoke, Mass.; Celotex Corp., Madison, Ill.; Robertson Paper Box Co. Inc., Montville, Conn.; Rogers Corp., Rogers, Conn.; United States Gypsum Co., Gypsum, Ohio.

International Paper Co., Livermore Falls, Maine; Quaker Oats Co., Pekin, Ill.; Celotex Corp., Avery, Ohio; Container Corp. of America, Wilmington, Del.; Johns-Manville Corp., Tilton, N. H.; National Gypsum Co., Newburgh, N. Y.; International Paper Co., Riley, Maine; Spaulding Fibre Co. Inc. (Hayes plant), North Rochester, N. H.; National Vulcanized Fibre Co. (Marshall Bros. Div.), Yorklyn, Del.; Charmin Paper Products Co., Little Rapids, Wis.; Banner Fibreboard Co., Wellsburg, W. Va.

Division II—Paper Converting

Paper Bags

Union Bag-Camp Paper Corp., St. Louis Bag Div., St. Louis; Thilmany Pulp & Paper Co., bag mill, Kaukauna, Wis.; St. Regis Paper Co., Kansas City, Mo.; Pillsbury Mills Inc., Wellsburg, W. Va.; St. Regis Paper Co., Playa Ponce, P. R.

Boxes and Cartons

Group A

Sealright Co. Inc., Kansas City, Kan.; Stone Container Corp., Chicago; F. N. Burt Co. Inc., Buffalo, N. Y.; General Foods Corp. (Carton & Container Div.), Battle Creek, Mich.; Container Corp. of America, Anderson, Ind.; Container Corp. of America, Fort Worth, Texas; New Haven Board & Carton Co., Ilchester, Md.; Container Corp. of America, Manayunk (Philadelphia), Pa.

Group B

Fibreboard Paper Products Corp., carton plant, Portland, Ore.; Owens-Illinois

CENTRALIZED SAFETY STATION at Hammermill Paper Co. is one of several to be located throughout the plant. This one in the Plastics Department was one of the first to be installed. Changing the safety poster is Robert Huey, plastics supervisor.

Hammermill Institutes Program of Centralized Safety Stations

Centralized safety stations located throughout the plant of Hammermill Paper Co. at Erie, Pa., are being planned and established by H.J. Hahn, safety director.

Safety messages and posters are coupled with emergency equipment. Thus, the No. 1 aim of the stations is to prevent accidents; while they secondly provide the necessary facilities to care for accident situations.

Already equipped with these stations are the plastics and maintenance departments and the pulp mill. Hahn reports that all major departments will boast similar facilities as soon as possible.

In the Plastics Department emergency equipment includes fire extinguishers, a stretcher cabinet, telephone, fire alarm indicator, a sign locating the nearest hot and cold water, a respirator, first aid supply cabinet and an emergency light for use in the event of power failure. (The stretcher cabinet contains stretcher, blanket and splints.)

Every station displays a poster approved by the medical director giving instructions as to how to handle accident victims. It covers essentials in first aid so that the major injuries such as arterial bleeding, failure of breath, shock cases and fractures are immediately and properly cared for. It also covers emergency telephone numbers and spells out the procedure for contracting the proper personnel for such equipment as an ambulance, inhalator, etc.

In a recent statement, Hahn reported that, "We plan to cover our complete plant with these stations. Each installation will be made up according to the locale. In the pulp mill gas masks are an essential part of the set-up, whereas in the paper mill attention will be centered on splash-proof goggles, etc. Posters will tie in with the departmental exposures."

APPA Safety Awards Go to 183 Mills

Awards of merit in safety for 1956 have been presented to 183 mills by the American Paper & Pulp Association. Certificates are presented to plants whose disabling injury frequency rate was below the 9.1 average for the industry.

In 1950 the frequency rate for pulp and paper was 17.1. It has been steadily improving each year since that time. In 1956 the average rate for *all* manufacturing industries, according to the United States Bureau of Labor Statistics, was 11.9.

Of the 348 mills reporting to the APPA, 18 had no disabling injuries last year. The top four were: Crown Zellerbach Corp., Port Townsend, Wash. (1,649,151 man-hours); Munising Paper Co., Munising, Mich. (1,517,742); Marinette Paper Co., Fort Edward, N.Y. (1,360,383), and Georgia Kraft Co., Macon, Ga. (1,251,014).

Glass Co. (National Container Corp. Div.), Bradford, Pa.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Dallas, Texas; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Greenville, Miss.; Mengel Co., Nashville, Tenn.; Container Corp. of America, Santa Clara, Cal.; Continental Can Co., Grand Rapids, Mich.; Hoerner Boxes Inc., Sand Springs, Okla.; Container Corp. of America, Greensboro, N. C.; Bradley & Gilbert Co., Louisville, Ky.; Container Corp. of America, Baltimore; Fibreboard Paper Products Corp., container plant, Sumner, Wash.; Container Corp. of America, Lake Shore plant, Chicago.

Container Corp. of America (Container Div.), Boston; Hankins Container Co., Chicago; Container Corp. of America, (Container Div.), Seattle; Container Corp. of America (Carton Div.), Seattle; Container Corp. of America, Traver Div.; Marathon Corp. of Washington, Sunnyside, Wash.; Hoerner Boxes Inc., Little Rock, Ark.; Container Corp. of America, Muskogee, Okla.; Fibreboard Paper Products Corp., San Joaquin, Cal.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Miami, Fla.; Mott Carton & Paper Co., St. Louis.

Roofing Paper

Ruberoid Co., Joliet, Ill.; Ruberoid Co., South Bound Brook, N. J.; Bird & Son inc., Chicago; Ruberoid Co., Erie, Pa.; Ruberoid Co., Savannah, Ga.; Ruberoid Co., Minneapolis; Ruberoid Co., Millis, Mass.; Johns-Manville Corp., Marrero, La.; Ruberoid Co., Baltimore; Certain-Teed Products Corp., Dallas; Flintkote Co. (Pioneer Div.), Portland, Ore.; Johns-Manville Corp., Los Angeles; Brantford Roofing Co., St. John, N. B.; Certain-Teed Products Corp., Tacoma, Wash.; Brantford Roofing Co., Thorold, Ont.

Insulation and Building Board

Flintkote Co., Meridian, Miss.; Johns-Manville Corp., Jarratt, Va.; Flintkote Co., Hilo, H. I.; Simpson Logging Co., Shelton, Wash.

Specialties

Marinette Paper Co., Fort Edward, N. Y.; Lily-Tulip Cup Corp., Augusta, Ga.; Kimberly-Clark Products, Niagara Falls, Ont.; Crown Zellerbach Corp., San Leandro, Cal.; Marathon Corp., Menasha, Wis.; International Paper Co., Kalamazoo, Mich.; Marinette Paper Co., South Glens Falls, N. Y.; Line Material Co., Sherman, Texas; Container Corp. of America, Piqua, Ohio; Crown Zellerbach Corp. (Waxide Paper Co. Div.), Kansas City, Mo.; Lily-Tulip Cup Corp., Galva, Ill.

Division III—Pulpwood Logging

Chesapeake Corp. of Virginia, West Point, Va.; Crown Zellerbach Canada Ltd., South Bentinck Camp.

Nekoosa-Edwards Paper Co.

has reported that employees of its Nekoosa, Wis. mill have achieved 1,000,000 man-hours without a lost-time injury. (In May Port Edwards passed the 1,000,000 mark.)

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Promising outlook for direct seeding with pine

The U. S. Department of Agriculture has announced the discovery of a bird and rodent repellent, tetramethyl thiuram disulfide, which can be easily applied to long-leaf pine seeds before seeding, making the direct seeding of trees practical and inexpensive. Direct seeding costs about $8.50 per acre, compared to $12.00 per acre for planting seedlings. The repellent is not harmful to birds or animals in the amount used and does not retard germination of the seed.

A molded pulp package for charcoal briquets

Clean enough to handle with white gloves at the family super market, this new charcoal briquet package made of pure molded wood pulp by the Diamond Match Co. contains approximately 2 lb. of charcoal briquets.

All the consumer has to do is touch a match to any of the four ignition tabs on the underside of the box, set it in the barbecue grill bottom down and leave it alone. The task of using paper, kindling and lighter fluid is thereby completely eliminated.

From paper to table top

One of the most important markets for U. S. Polymeric Chemicals Co. currently is the decorative laminate field. Some 35 per cent of the company's business is in the supply of resin-impregnated papers to decorative laminators. The finished laminate is a multi-layer sandwich of resin-impregnated papers bonded together under heat and pressure.

Paper permanency

The degree of polymerization of the paper fiber is the main factor affecting durability of paper. The degree of polymerization should be at least 1000-1200 for a paper of maximum durability, it is reported. Other important factors contributing to durability are a high alpha-cellulose content (over 90 per cent), a relatively low copper number (less than 1.5) and a pH value that is not too low.

Neutral sizing of paper

Both laboratory and mill scale experiments have shown that paper sized under neutral conditions (pH 6.2-7.3) has better strength properties (especially with regard to folding endurance) than acid-sized paper. Brightness and percentage retention of filler, however, are somewhat lower.

Neutral sizing of paper, it is claimed, permits more economical use of aluminum salts and lessens the rate of corrosion of plant equipment.

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